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Wildlife Restoration Division

QUARTERLY REPORT



OCTOBER - DECEMBER, 1949

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PROJECT 36-R
DATE January 15, 1950

QUARTERLY PROGRESS REPORT
FOR
SURVEYS AND INVESTIGATIONS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Lincoln County Deer Management Unit
2. Project Personnel: Jack E. Schmautz.Unit Biologist
Ade Zajanc.Assistant Unit Biologist
Roger Fish.Biologist

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KOOTENAI UNIT

PROGRESS REPORT

LINCOLN COUNTY BIG GAME MANAGEMENT UNIT

DATE:

January through December, 1949.

PERSONNEL:

Jack E. Schmautz, Unit Biologist, Wildlife Restoration Division
Ade Zajanc, Assistant Unit Biologist, Wildlife Restoration Division
Roger L. Fish, Biologist, Wildlife Restoration Division

PURPOSE:

The purpose of this report is to present the progress made in the Lincoln County Deer Study.

PROJECTS:

Trapping Program

One hundred and twenty-six deer were trapped in the lower Fisher and Wolf Creek areas. They were marked on the rump and tail with a yellow hair dye and ear-tagged with aluminum tags.

The purpose of this program was to get a number of marked deer into the woods so that the Lincoln Index method of estimating deer populations could be used later on.

Mass Counts

Eighteen men counted 1,381 white-tail and 181 mule deer, 11 elk and 15 coyotes in the Lower Fisher and Wolf Creek areas. Included in the white-tail deer seen were 24 marked deer.

As a result of this study and using the Lincoln Index, the deer population was estimated at 7,250 white-tail deer, plus an undetermined number

of mule deer.

Winterkill Survey

The carcasses of 116 deer, including six marked deer, were found in a survey conducted in the lower Fisher and lower Wolf Creek areas.

From these findings it was estimated that the total winterkill in the area was approximately 2,400 deer, or 33 per cent of the herd.

Browse Seeding Study

A study of browse seeding was started. This study is being carried on in the four one-acre plots previously established near the Wolf Creek Guard Station and on Wapiti Mountain. There is one fenced and one unfenced plot at both locations. In each plot were established 16 seeding blocks, each 14 ft. by 24 ft. In the Wolf Creek plots the seeding blocks are contiguous and located in the north end of the plots, while in the Wapiti plots they are scattered.

Four site treatments representing conditions common to logged-off areas were used. They were: (1) scarification; (2) burning; (3) lopping and scattering of slash; and (4) undisturbed forest floor. One site treatment was applied to each block thus giving four replications of each treatment in each large plot.

In the Wolf Creek plots the scarification and slash piling was done by hand, while in the Wapiti plots the scarified areas (cat and skid roads) and brush piles incident to logging were used as site locations for the corresponding seeding blocks.

All seeding was done by hand. Species planted in each block were bitterbrush, chokecherry, kinnikinnick, mountain maple, red osier dogwood, rose, serviceberry, snowberry, snowbrush and trailing hollygrape. Nannyberry was to have been planted also, but because of a crop failure in this species this

year, no berries were picked.

The purpose of these plantings is to determine the type of site treatment best suited for the seeding of various native species of browse.

Plant Succession Studies

A series of 1/3000-acre circular plots were established in each of the four large plots mentioned above. A total of 863 plots were established, apportioned as follows:

Wolf Creek Exclosure - 201

Wolf Creek Check Plot - 224

Wapiti Exclosure - 218

Wapiti Check Plot - 220

Locations of the small plots were established in a completely random fashion by drawing from a table of ten thousand randomly assorted digits in G. W. Snedecor's book, "Statistical Methods," Iowa State College Press, Ames, Iowa. An orange painted spike was used to mark the center of each plot for future reference.

Vegetative composition and density were determined by ocular estimate and recorded on forms prepared for the study.

The purpose of this study is to obtain a record of the present vegetative composition and density of the large plots so that they can be compared with that which will be present five years from now.

Browse Survey on Swede Mountain and Horse Range

A survey was made to determine the utilization of browse on Horse Range and Swede Mountain. This survey revealed that 42.6 per cent of the annual growth of all browse species on the Horse Range and 20.3 per cent on Swede Mountain had been utilized.

Survey of Feed Production on Five Winter Ranges

The amount of deer food in pounds per acre was estimated on five winter ranges: East Fisher, Wolf Creek, Dunn Creek, Canyon Creek and Wapiti Mountain.

Amount of food produced was most on the least used ranges, and least on the heaviest used ranges. Conifer reproduction varied almost directly with browse production.

1949 Hunting Season

The lower Fisher River Drainage north of Highway No. 2 was opened to antlerless deer hunting this year. The hunters harvested 432 does and fawns and 145 bucks. The season on antlerless deer was closed when it became apparent that there was a danger of running over the desired take of 500 antlerless deer.

The data obtained from the checking stations has not been worked up as yet and will be presented in a subsequent report.

Buck-Doe-Fawn Ratio Counts

Weather this year was poor for obtaining data for buck-doe-fawn ratios. Only 289 white-tail and 53 mule deer were seen in the county-wide survey. Ratios obtained from these figures are as follows:

For white-tail deer:

Buck-doe ratio = 1:4.19

Doe-fawn ratio = 1:.404

For mule deer:

Buck-doe = 1:2.65

Doe-fawn = 1:.5

However, it is felt that not enough deer were seen to obtain representative ratios.

Submitted by:
Jack E. Schmautz, Unit Biologist
Wildlife Restoration Division

TRANSECT RECORD - BROWSE FORAGE CONDITION

*Transect no. 3 Location Canyon Creek Rd. N 55°E
Site class - Date burned --- Returned --- Logged ---
Exposure S to SW Slope (%) 10 Elevation ---
Forest type P. Pine
Use by deer - None --- Light --- Moderate --- Heavy X

Plot Record - Mil-Acre Basis

Is plot located on old road, skidway or landing? No

Plot number	Estimated pounds low browse forage, 6" to 18"	Estimated pounds high browse forage, 18" to 72"	Per cent conifers of plot surface area
1	6 oz.	None	40
2	2 oz.	"	20
3	8 oz.	"	10
4	12 oz.	12	None
5	1 oz.	9	"
6	8 oz.	16	15
7	7 oz.	2	5
8	---	-	100
9	3 oz.	-	15
10	1.5 oz.	15	25

Transect Record

Low browse species - in order of dominance.

Cr. hollygrape Kinnikinnick Spirea Rose Snowberry

High browse species - in order of dominance

Serviceberry Snowbrush Ninebark Rose Snowberry

Conifer species - in order of dominance

Douglas fir Larch P. Pine

of the relative productions of the ranges sampled.

FINDINGS AND DISCUSSION:

The amount of browse feed produced on the areas studied is recorded in Table 2.

TABLE 2. Weight of browse feed produced on five deer winter ranges in Lincoln County, 1949.

Area	Browse Produced						Per Cent of Ground Surface Covered by Conifer Repro.
	Mean Weight Per M.L-Acre in Ounces			Pounds Per Acre			
	Low	High	Total	Low	High	Total	
East Fisher	4.260	6.140	10.400	266.3	383.8	650.1	13.07
Wolf Creek	.163	.035	.198	10.2	2.2	12.4	.33
Canyon Creek	4.730	2.115	6.845	295.6	132.2	427.8	13.74
Dunn Creek	2.425	.467	2.892	151.6	29.2	180.8	3.72
Wapiti Mtn.	1.190	.450	1.640	74.4	28.1	102.5	2.77

Comparison of Tables 1 and 2 reveals that browse production on these five ranges varies inversely with the intensity of use by deer during the winter. The lightly used East Fisher range produced more browse feed this summer than any of the other four ranges studied and more than fifty times as much as was produced on the Wolf Creek range, the most intensively used of the ranges studied.

Classification of the browse into "low" and "high" categories shows that in the lightly used East Fisher range high browse makes up 59 per cent of the total feed, while on the overused Wolf Creek range it makes up only 17.7 per cent of the feed. See Table 3.

TABLE 3. Proportion of low and high browse produced on the five ranges studied.

Area	Weight Produced (Lbs./A.)	Low Browse (%)	High Browse (%)
East Fisher	650.1	41.0	59.0
Wolf Creek	12.4	82.3	17.7
Canyon Creek	427.8	69.1	30.9
Dunn Creek	180.8	83.8	16.2
Wapiti Mountain	102.5	72.6	27.4

Normally the greater portion of the low browse, 0 to 18 inches high, is covered by winter snows and is generally unavailable to the deer, especially if a crust develops on the snow. This means that, with the exception of East Fisher, most of the food produced on these ranges is snow-covered and unavailable to the deer even during a normal winter.

Conifer Reproduction. Not only browse production, but the density of conifer reproduction is apparently also correlated with deer use. In the ranges most abused, conifer reproduction is the least while the reverse is true on lightly used ranges. It is also interesting to note that conifer reproduction varies generally as the weight of browse produced. This might indicate that in those ponderosa pine areas where winter concentrations occur, deer use is more of an ecological factor to be considered in forest reproduction than is competition by shrubs. An intensive study on this phase of deer-forest management might reveal some interesting information on the subject that could have a bearing on the management of ponderosa pine stands in this country.

Composition. No effort was made to make a survey to determine the composition and density of the browse present on the area. However, each of the

investigators recorded the five most important shrubs in both browse categories encountered in the mil-acre plots. These are shown in Table 4.

TABLE 4. Browse species on the ranges studied in order of importance.

Area	Browse Class	Order of Importance				
		1	2	3	4	5
East Fisher	Low	Sod*	Auv	Slc	Ore	ROS
	High	Aan	Sod	Slc	ROS	Cve
Wolf Creek	Low	Aan	Pde	ROS	Slc	Auv
	High	Plw	-	-	-	-
Canyon Creek	Low	Slc	Auv	Ore	Sod	Aan
	High	Aan	Cve	ROS	Sod	Oma
Dunn Creek	Low	Auv	Slc	Aan	Cve	ROS
	High	Aan	Cve	Lca	ROS	Oma
Wapiti Mtn.	Low	Slc	Ore	Auv	Vca	ROS
	High	Sod	Aan	ROS	Cve	Slc

* See Table 5 in appendix for common names

Serviceberry was the most important browse species over 18 inches high on all ranges except Wapiti Mountain where it was second to snowberry, and on Wolf Creek where none was found over 18 inches tall. It is interesting to note that only one species, mockorange, was classified as "high browse" in the latter range.

The important low browse species are spirea, kinnikinnick and creeping hollygrape; but on Wolf Creek the most important low species were serviceberry and chokecherry. This is probably because over-utilization by deer during winter prevents these latter two species from growing higher than 18 inches.

SUMMARY:

Five winter ranges in Lincoln County were sampled by the weight-estimate-by-plot method to determine the weight of browse feed produced per acre. The ranges sampled were East Fisher, Wolf Creek, Canyon Creek, Dunn Creek

and Wapiti Mountain. These ranges are comparable as to slope, vegetative dominants and exposure but differed slightly as to annual precipitation received by each.

Food production varied from 12.4 pounds per acre on heavily used deer range on Wolf Creek to 650.1 pounds per acre on lightly used range on East Fisher River. The bulk of the food produced on East Fisher was by high browse while on the heavily used ranges most of the food produced was below 18 inches.

Density of conifer reproduction varied from 13.74 per cent of the ground surface covered on the Canyon Creek range to .33 per cent on Wolf Creek.

In general, serviceberry was the most important high browse species except on Wolf Creek where none was found over 18 inches high. Spirea, kinnikinnick and creeping hollygrape are important low browse species.

APPENDIX

Table 5. Common and technical names and accepted abbreviation of browse species encountered in the survey. (From U. S. Forest Service, Region 1.)

Common Name	Technical Name	Abbreviation
Serviceberry	Amelanchier alnifolia	Aan
Kinnikinnick	Arctostaphylos uva-ursi	Auv
Snowbrush	Ceanothus velutinus	Cve
Nannyberry	Lepargyrea canadensis	Lca
Creeping Hollygrape	Odostemon repens	Ore
Ninebark	Opulaster malvaceous	Oma
Mockorange	Philadelphus lewisii	Plw

TABLE 5 (Continued)

Common Name	Technical Name	Abbreviation
Chokecherry	<i>Prunus demissa</i>	Pde
Rose	<i>Rosa sp.</i>	ROS
Spiraea	<i>Spiraea lucida</i>	Slc
Western Snowberry	<i>Symphoricarpos occidentalis</i>	Sod
Dwarf Huckleberry	<i>Vaccinium caespitosum</i>	Vca

Submitted by:

Jack E. Schmutz, Unit Biologist
Wildlife Restoration Division

Ade Zajanc, Assistant Unit Biologist
Wildlife Restoration Division

November 1, 1949

SEASONAL MIGRATION OF WHITE-TAIL DEER

IN THE FISHER RIVER DRAINAGE

Preliminary Report

DATE:

January, February, October, November, 1949

PERSONNEL:

Jack E. Schmautz, Unit Biologist, Wildlife Restoration Division

Ade Zajanc, Assistant Unit Biologist, Wildlife Restoration Division

Roger Fish, Biologist, Wildlife Restoration Division

PURPOSE:

In January and February of 1949, a trapping and marking program was carried out in the lower Wolf Creek area in Lincoln County. This report records some of the results obtained from the trapping program and of the 1949 hunting season pertaining to the seasonal movements of white-tail deer wintering in that area.

PROCEDURE:

Two corral-type and four individual or box-type traps were used to capture the deer. The former were made of 8 ft. by 12 ft. wood panels arranged to form a corral with a swinging door. The latter were 4 ft. by 4 ft. by 12 ft. in dimension and had a drop-gate at each end. Second-cutting alfalfa was used to bait the deer into the traps. Location of the traps are shown in Table 1 and Map 1.

TABLE 1. Location of traps in Fisher River - Wolf Creek Area, 1949.

Trap Number	Name	Location
1	Cow Creek	SW $\frac{1}{4}$ S 6, T28N, R28W
2	Lightning Peak #1	SW $\frac{1}{4}$ S 35, T29N, R29W
3	Lightning Peak #2	SW $\frac{1}{4}$ S 35, T28N, R29W
4	Grade	NE $\frac{1}{4}$ S 34, T29N, R29W
5	Ariana Creek	NW $\frac{1}{4}$ S 36, T29N, R29W
6	Wolf Creek Corral	NE $\frac{1}{4}$ S 30, T29N, R26W
7	Below Richards Cr., $\frac{1}{2}$ mi.	SW $\frac{1}{4}$ S 20, T29N, R26W
8	Richards Creek	SE $\frac{1}{4}$ S 20, T29N, R26W

Captured deer were ear-tagged with serially numbered aluminum ear tags and marked on the rump and underside of the tail with a yellow hair dye. The dye used was a saturated solution of picric acid crystals in 40 per cent ethyl alcohol. This is a permanent dye and remained on the deer until the hair was shed the following spring. The hair of two deer marked on January 11 and 19 still had an orange hue after having laid on the ground all summer and through the hunting season.

The deer were released at the trapping site after marking and tagging.

Subsequently, the location of any marked deer that was seen, found dead or shot during the 1949 hunting season, was recorded on maps as accurately as the information permitted.

RESULTS:

Six marked deer were found dead, either as coyote kills or as winter-kills; two were seen during the summer and five were killed during the hunting season.

Point of capture was definitely established for two of the deer found dead and for the five deer killed during the hunting season. These marked deer which were recovered are shown in Table 2 together with place of marking and location of kill or observation.

TABLE 2. Marked deer recovered in Fisher River Drainage, 1949.

Tag No.	Sex	Age	Date	Where	Date	Where	Airline Distance from where marked
			Trapped	Trapped	Killed or Observed	Killed or Observed	
C-2021	Doe	3	Jan. 8	6	Apr. 22	Richards Cr.	.8 mi.
C-2045	Doe	3+	Jan. 14	6	Oct. 24	Little Wolf	11.9 mi.
C-2072	Doe	Yrlg.	Jan. 21	1	Oct. 16	Brush Creek	20.5 mi.
C-2076	Doe	3+	Jan. 23	5	Oct. 31	Fairview	12.0 mi.
C-2086	Doe	Yrlg.	Jan. 27	1	Oct. 15	Upper Wolf Cr.	21.3 mi.
C-2091	Doe	3	Feb. 1	7	Oct. 21	Backus Creek	3.1 mi.
C-2118	Doe	Fawn	Feb. 11	6	Mar. 22	Wolf Creek	1.7 mi.

The four dead deer, for which no tags were recovered, were found from one-half to two miles from the nearest traps. (See Map 1) They were all found in March and April and therefore had little opportunity to get off their winter range.

Two tagged deer were seen during the summer. A doe was seen by Mr. Bill MacDonald near his home on Spring Creek, which is 8.8 miles airline and 12 miles by road from the nearest trap. Another doe was seen several times at the Fairview Ranger Station by Mr. Ben Baenen. She may have been the same doe (C-2076) that was later shot near there during the hunting season.

DISCUSSION:

With the exception of the doe seen on Spring Creek and the two found dead on Cow Creek, all of the deer recovered were in the Wolf Creek Drainage. This pretty definitely establishes the point that the deer summering in the Fairview and Little Wolf Creek areas do migrate down to the lower Wolf Creek, lower Cow Creek and Fisher River to spend the winter.

This means that some of the deer have to migrate at least 20 to 25 miles or farther as shown by the two does (C-2072 and C-2086) which were shot 20.4 and 21 miles airline respectively from the Cow Creek trap where they had been tagged. (See Table 2.) Their probable route of migration,

through the low saddle east of Lightning Peak, is close to 25 miles.

Observations made during the winter of 1948-49 indicate that the main path of migration, at least from the Fairview area to the lower Wolf Creek, is through the saddle north of Redemption Hill and then along the benches and south slopes to the area below Backus Creek. Undoubtedly, the return route is somewhat different, probably more closely paralleling the stream.

The one doe seen on Spring Creek in May was approximately 12 miles from the nearest trap and may have been on her way up the Fisher. This may indicate a winter movement of deer from Miller Creek and the West Fisher into the lower Fisher and back again in the spring and summer. However, this is still conjecture and should be regarded as such until further returns of marked deer are obtained from those two areas.

CONCLUSIONS:

1. White-tail deer in the upper Wolf and Little Wolf Creeks do migrate to the lower Wolf and Fisher River for the winter. This means a migration of at least 20 to 25 miles for some deer.

2. There may be a migration from West Fisher and Miller Creek to the lower Fisher.

RECOMMENDATIONS:

1. The tagging and marking campaign should be continued in order to get a number of marked deer in the country.

2. Observations and records should be continued to more accurately determine the routes of migration of the white-tail deer in Lincoln County.

Submitted:

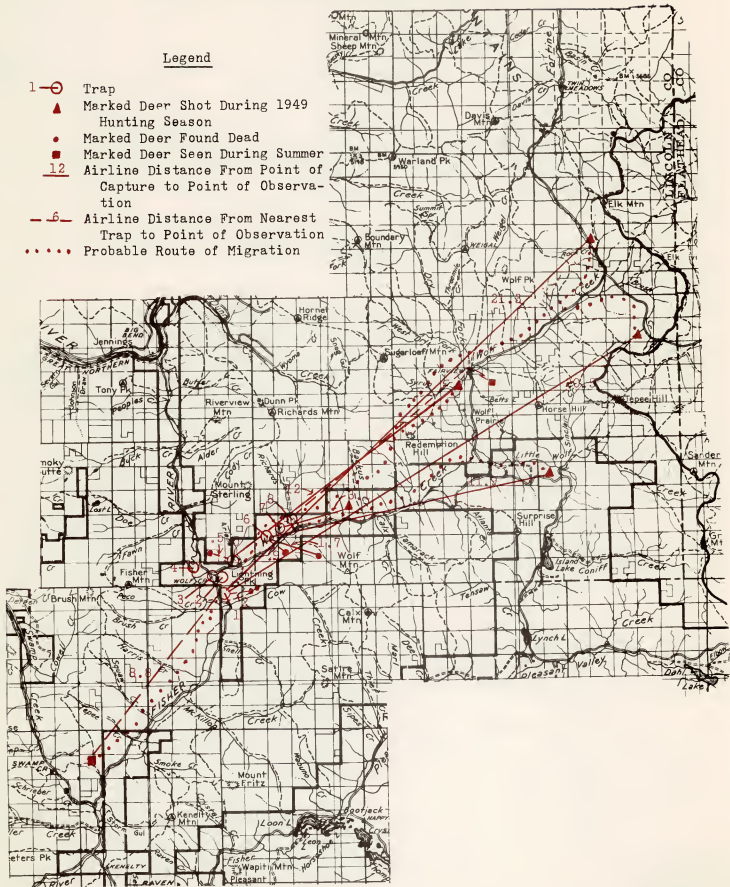
Jack E. Schmautz, Unit Biologist
Wildlife Restoration Division

Map 1.

Seasonal Migration of Whitetail Deer
In Fisher River Drainage, Lincoln County, Montana

Legend

- 1-⊙ Trap
- ▲ Marked Deer Shot During 1949 Hunting Season
- Marked Deer Found Dead
- Marked Deer Seen During Summer
- 12 Airline Distance From Point of Capture to Point of Observation
- 5- Airline Distance From Nearest Trap to Point of Observation
- Probable Route of Migration



STATE Montana
PROJECT 33-D
DATE January 15, 1950

QUARTERLY PROGRESS REPORT
FOR
DEVELOPMENT PROJECT
As Required By
FEDERAL AID TO WILDLIFE RESTORATION ACT

MONTANA FISH AND GAME DEPARTMENT

BLACKFOOT-CLEARWATER GAME RANGE UNIT

PERSONNEL:

Stan Mongrain - Unit Manager, Wildlife Restoration Division

Charles Harkness - Assistant Unit Manager, Wildlife Restoration Division

Jack Ray - Laborer

REPORT OF PROGRESS:

A. Construction

1. Road Construction

As the forested lands in the Blackfoot-Clearwater Acquisition are under the Blackfoot Fire Protective Association, a road running east and west from headquarters to the Clearwater River was constructed on a cooperative basis. The Blackfoot Fire Protective Association furnished the equipment-- a bulldozer and power grader, and the Department supplied the men. The

road is 9 miles long; 1 1/4 miles being of new construction, 4 3/4 miles of old railroad grade, and 3 miles of old wagon grade. Ties, down timber, and boulders were removed by the dozer and the surface finished with a power grader. The road grade is cut to mineral soil which makes a fire break as well as an access road into this area during both the summer and winter.

2. Headgate Construction

Since irrigation is the most important factor in securing a hay crop from the meadows, headgates had to be constructed to divert the water from the creek channel into the ditches. Due to freezing weather early this fall, a log structure was built in place of concrete. One headgate is completed and the other one will be finished next spring.

3. Building Construction and Remodeling

The buildings selected to be used in the management of the unit were in need of repair and remodeling in order to be more practical for departmental needs.

The stable originally designed for 24 horses and 40 tons of hay was changed to hold 8 horses and 65 tons of hay. Partitions were removed. The salvaged material was used in adding a saddle and other equipment room.

A log structure close to the bunkhouse, being in an ideal location for a shop and storage place for fire fighting equipment, was repaired. A concrete floor replacing a board floor and a double doorway cut in the side made a useful addition to the property.

To the rear of the dwelling used by the manager, a 10 ft. by 24 ft. shed type building was added. Setting on a concrete foundation with shiplap sides and a steep-pitched roof this building protects the deep-well water system and also serves as a wood shed.

B. Other Activities

1. Trespass Stock

Protecting the unfenced leased land from estrayed stock has proven a problem this fall. Due to the location and lack of adequate fences this area has been overrun by horses for many years. A part of the vital deer range and most of the elk range lies in this area. Special attention has been placed on keeping the stock off. Full time for one man would be required to handle this situation completely.

2. Wood Supply

The buildings at Headquarters are heated entirely with wood. Approximately 70 cords are required for a year. This supply was cut and hauled during the past quarter.

3. Hay Distribution

Baled hay, supplied by the Blackfoot-Clearwater Unit, has been distributed to various parts of the state to be fed by Department personnel to saddle and pack stock for fall and winter range work.

4. Field Work

Unit Biologist, Lloyd McDowell, assisted by Stan Mongrain, Unit Manager, and Frank Gummer, Fieldman, carried on the range survey and game census work separate from the other activities.

An area was selected that has an average game population of both white-tail deer and elk. This block is being cross sectioned on section lines. The lines are run out by compass and blazes made on medium-size green trees so they will be a permanent marking. These same strips will be used from year to year for game census as well as range management.

Game migration to winter range started the middle of December so the field work swung to migration route study and to diverting the game onto

Department-owned range.

5. Fire Control

The fire season extended to the middle of October this year in Western Montana. Considering the extremely dry summer the Blackfoot-Clearwater Unit was fortunate in escaping with only three small lightning strikes. There was no loss of forage from these fires.

Submitted by:
Stan Mongrain, Unit Manager
Wildlife Restoration Division

STATE Montana
PROJECT 37-R-1
DATE January 15, 1950

QUARTERLY PROGRESS REPORT

1. Title of Project: Game Range Predevelopment Survey
2. Project Personnel: Richard L. Hodder, Range Technician, Wildlife
Restoration Division

Verne Sylvester, Student Assistant, Wildlife
Restoration Division

During this quarter the clipping of the production-utilization transects on the Gallatin elk winter range was completed. The clippings were segregated into two categories--grasses and forbes--and allowed to dry. Each lot was then weighed and recorded for this season's production figure.

A browse propagation project was begun in conjunction with the Department of Horticulture at the Montana State College. Approximately 10,000 cuttings of 18 species of browse endemic to the Gallatin Canyon were collected. Genera represented in this work were: Cornus, Alnus, Salix, Betula, Physocarpus, Arctostaphylos, Acer, Philadelphus, Sambucus, Rosa, Lonicera, Pachystima, Linnaea, Shepherdia, and Artemisia. These cuttings were prepared and stored in damp vermiculite in the root cellar at the State College for callousing until next spring. After the data is obtained on the callousing by the Horticulture Department, these cuttings will be returned to this field crew for planting in the field.

Fall reseeding trials were planted during this quarter, some 20 prepared plots being set out. Species planted were: Oryzopsis hymenoides, Agropyron

intermedium, Agropyron spicatum, Festuca ovina, durescula, Festuca ovina, and Elymus condensatus. Accompanying the prepared trials, more extensive plantings were made on several ridges and knolls without a prepared seed bed. The species broadcast included Agropyron intermedium, Oryzopsis hymenoides, and Astragalus pulcatus.

The plans for the office phase of the range survey now in progress were made at Bozeman. Office work is scheduled to begin at Missoula, Forest Service Office, January 9, 1950.

Submitted by:

Richard L. Hodder, Range Technician
Wildlife Restoration Division

STATE Montana
PROJECT 41-R
DATE January 15, 1950

QUARTERLY PROGRESS REPORT
FOR
SURVEYS AND INVESTIGATIONS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Hunter Harvest Determination
3. Report of Progress:

Collection of data was concluded at the checking stations and is now being summarized for analysis. Tabulations of checked hunter harvest is included in the following table.

TABLE 1

Summary of Hunter Harvest

Station	ELK				MULE DEER		WHITETAIL		Black		Mtn.
	Male	Female	Young	Total	Male	Female	Male	Female	Bear	Grizzly	Goat
Sun River				619	466		1		5	4	
South Fork	72	62	14	148	2				2	1	11
Swan	21	13	8	42	5		90				
Seeley Lake	20	28	9	57	7		43		1		4
Divide	17	16	9	42	256				5		
Tash	5	2		7	9						1 moose
Mill Creek	22	28	9	59	137	57					3 moose
Fleecer	8	6	2	16	1						
Ruby	57	47	1	105	258	324					
Gallatin	226	350	134	710	102				2	1	13 moose
Utica	49	3		52	317				1		
Blacktail	136	203	55	439	38						

Total Elk Checked - 2,289

Total Mule Deer - 1,912

STATE Montana
PROJECT 35-R
DATE January 15, 1950

Q U A R T E R L Y P R O G R E S S R E P O R T
F O R
S U R V E Y S A N D I N V E S T I G A T I O N S
As Required By
F E D E R A L A I D I N W I L D L I F E R E S T O R A T I O N A C T

1. Title of Project: Gallatin Management Unit
2. Project Personnel: J. E. Gaab, Unit Biologist, Wildlife Restoration Division
James B. Angstman, Fieldman, Wildlife Restoration Division
Don Johnson, Student Asst., Wildlife Restoration Division
3. Report of Progress:

During the fall quarter, studies were continued on the migration of elk in the Yellowstone, Madison, and Gallatin. Particular emphasis was made of elk response to weather and hunting pressures.



GALLATIN UNIT

West Gallatin Winter Elk Study

1948-1949 Supplemental to Report of 1947-1948

AREA COVERED

The area covered during this study included the entire West Gallatin River Drainage and areas adjacent which influence the west Gallatin elk herd. The West Gallatin River is in southern Montana and a part of northwestern Yellowstone National Park. Areas adjacent to the West Gallatin River that were taken into consideration included the headwaters of the Gardiner and Madison Rivers.

PERSONNEL:

Dick Hodder, Range Technician, Wildlife Restoration Division

J. E. Gaab, Unit Biologist, Wildlife Restoration Division

DATES:

The study began on October 1948 and continued through May 1949.

COVERAGE:

From October to December the area was covered on horseback supplemented with three aerial reconnaissance flights. From December to May snowshoes were the only means of travel supplemented by three aerial reconnaissance flights. During May observations were made on foot and horseback.

The aerial surveys made are the only means of obtaining migration patterns. The actual drift occurs at the same time throughout the area and cannot all be followed from the ground.

Time did not permit the amount of ground work necessary to observe migration patterns. The use of a 170 Cessna, weather permitting, made it possible to observe nearly all the movements of elk and the amount of inter-

mingling between herds.

FINDINGS:

A. Present Elk Populations:

The actual counting of the herd was carried out in February and March. During these months, the elk are more stable than at other periods.

Conditions were quite favorable for censusing in March. Until the latter part of February, the elk foraged primarily in the timber. The snow depth had reached about 30 inches when the weather broke. When it started to get warm, the south slopes and ridge tops bared rapidly. When these areas bared off, the elk concentrated on them. The only difficulty observers had at this time was in keeping track of specific groups while sexing and aging them. When the snow reached about 30 inches and became packed for a couple of days, the elk started to drift down the river. This was a slow movement and calves were included. The drift back and onto open slopes and ridges was fast and the calf elk were left behind. This condition affected the balance of age groups.

TABLE 1. Number and location of elk during February and March, 1949, on the elk winter range in the West Gallatin River Drainage above Karst Kamp.

Winter Range	Number of Elk
Drainages Above Snowflake Spring	440
Grouse Mountain	20
Sage Creek	9
Taylor Fork Drainage	631
Cinnamon Creek	21
Buffalohorn Creek	89
River below Mouth of Cinnamon Creek	8
Elkhorn Creek	30
Buck Creek to Beaver Creek	40
Twin Cabin Creek	15
Porcupine Creek	324
Levinski Creek to Wilma Creek	30
Dudley Creek to Asbestos Creek	34
Mud Creek	15
West Fork	3
Total	1,709 elk

Seventeen hundred and nine elk were all the elk that the observers making this study were able to locate. This included small isolated groups that could only be observed by the use of a plane. Nearly all the elk that could be reached on the ground by the use of snowshoes, were recounted several times so that a most accurate census was made.

B. Annual Increase of Elk

The following table shows the number of calf elk in comparison with the total number in each drainage. The total 1,709 elk could not be grouped this way because close enough observations weren't possible to distinguish between calf and yearling elk in some groups.

TABLE 2. Number of calf elk in comparison with total number.

Drainage	Total Elk	Calf Elk
Above Cement Bridge (Park)	8	2
Black Butte to Specimen Creek	45	15
Daly Creek	91	12
Tepee Creek	118	10
Monument Creek	44	4
Buffalohorn Creek	86	24
Cinnamon Creek	6	1
Porcupine Creek	301	21
Taylor Fork Creek	529	227
Dudley-Asbestos Creek	21	3
Total	1,249	319

From the above table 319 calves is 25.5 per cent of the total 1,249 elk. An annual increase of 25.5 per cent seems quite high for elk. The observers consider this figure probably 2 or 3 per cent high. The unaged elk that were observed from a distance appeared to have a low per cent of calves. Had it been possible to age all 1,709 elk observed, the annual increase figure would probably be a little less.

Before aging any elk, the observers felt that the annual increase would be higher than the usual accepted figure of 17.5 per cent. In 1947 the

estimated number of elk was 2,600 and estimated loss was 400, a loss of 16 per cent. In 1948 the actual count of elk was 1,372; an actual count of winterkill carcasses was 103. Eighty-four of the 103 were calf carcasses, or a loss of 6.1 per cent of the 17.1 per cent annual increase.

There was a heavy loss in 1947--a large number of old animals probably past breeding age (if elk reach a non-breeding stage) were lost as well as a large per cent of calves. Then, with only an 11 per cent annual increase in 1948, it seems logical to conclude that the per cent of breeding cows in this herd would be high. This was also indicated in the spring of 1948 when 86 calf elk were tagged when the usual number of calf elk tagged in previous years was 30 to 40 head.

C. Sex ratio

The following table is a tabulation of the total number of elk by drainage and the number of male elk in each drainage.

TABLE 3. Total number of elk and number of male elk in each drainage.

Drainage	Total Elk	Males (2½ yrs. & older)	Spikes
Above Cement Bridge (Park)	8	4	
Black Butte to Specimen Creek	45	8	
Daly Creek	91	8	
Tepee Creek	118	1	1
Monument Creek	44	1	
Buffalohorn Creek	86	10	2
Cinnamon Creek	6	3	
Porcupine Creek	301	28	3
Taylor Fork Creek	750	34	7
Levinski to Wilma Creek	30	20	
Dudley to Asbestos Creek	21	7	
Mud Creek	16	5	
West Fork Creek	3	3	
Totals	1,619	132	13

Fifteen hundred and nineteen elk, minus the calf crop of three hundred and eighty-seven calves, leaves eleven hundred and twenty-two elk including

yearlings, divided by one hundred and forty-five bulls (mature bulls plus spikes) gives a sex ratio of 1:7. By subtracting the calf crop and the number of spike bulls, and an equal number for yearling heifers, the sex ratio of breeding elk (assuming yearlings aren't of breeding age) is 1:5.44. Figuring the total number of elk divided by the total number of males, considering one-half the calf crop are males, the actual sex ratio is 1:4.5.

To figure sex ratio by dividing the number of mature bulls, plus the spikes, is no doubt very inaccurate.

Taking last year's figures of thirteen hundred and seventy-two elk, and an alive increase of eleven per cent, should show 5.5 per cent male yearlings among this year's total sexed herd minus this year's annual increase. Twenty-five and five-tenths increase, subtracted from one thousand and nineteen elk, is eleven hundred and thirty-two elk of which there were only thirteen spike bulls. The per cent of last year's male increase observed this year is only 1.14 per cent. Only one-fifth of last year's male calves could be observed this year as spike bulls.

- Questions:
1. Is there a heavier mortality among male elk during the first year than there is among females?
 2. Do all yearling male elk have spike antlers?
 3. Can actual sex ratio be determined when not knowing the above two questions?
 4. Do male yearlings breed?
 5. Do female yearlings breed?

An interesting observation can be made in the Gallatin in 1950. During this past winter, 1948-1949, the winter loss on 1,809 elk (estimated 100 head below Karst Kamp added) was only 1.27 per cent. Only eighteen calf carcasses were found. This low per cent loss should reflect little effect on the

number of male elk bearing spike antlers next year. If by close observations, it is found that nearly 11.5 (subtracting .5 per cent winter loss) per cent of the herd are spike bulls, after this spring calf crop is deducted, it would be reasonable to believe that there is a higher mortality among males than there is among females during their first winter. If this is found to be true, it would be a partial explanation of the sex ratio spread.

Over a period of 10 years there have been sexed 410 elk calves during tagging, of which there were 206 females and 204 males; yet as shown above, this nearly 50-50 ratio isn't maintained among mature elk.

D. Weather Conditions

The accumulative snow depth taken at Squaw Creek Ranger Station during the period of this study was 148 inches. The average snow depth over a twelve-year period is 104 inches. Despite the excessive snow depth and extreme cold weather during January and early February, the winter loss among elk was not great. The consistency of the snow did not inhibit the elk pawing. Although the snow in many timbered areas was 25 to 30 inches deep, it was granular and could easily be moved so the elk could reach the grass in addition to browsing. During the early winter there was an unusual amount of wind which kept the open ridges reasonably bare. The elk foraged in the timber until middle February. When the weather broke it thawed the ridges and the elk took to them as the snow got heavy in the timber. This thawing continued until sufficient foraging area was opened up to last until the spring thaws began.

E. Losses

The loss of elk due to malnutrition, disease, and predation during the period that this study was made is 1.27 per cent of the total herd.

During the past winter, only one group of elk became isolated in an

area where there wasn't sufficient forage for them to sustain life. A group of five calves and one cow elk became isolated in Squaw Creek, and they did not survive the winter. Only a casual carcass was found on the winter range.

The introduction of 1080 poison within the area has reduced the coyote population to the extent that they are no longer a hazard for the elk (particularly young calves).

There was no visible evidence of disease among this elk herd observed during this past winter. In early spring a light infestation of ticks (Dermacentor albipictus) was observed. However, it is felt that the presence of these parasites had little if any effect on the physical condition of the animals.

F. Range Condition and Trends

Range condition and trends will be covered in a separate report.

G. Migration

A complete map showing the routes of travel by migratory elk will be incorporated in a separate range condition report.

H. Experimental Elk Herding

For a number of years Gallatin elk have migrated up Taylor Fork and over Cache Creek Pass across Indian Creek and into Bear Creek on the Madison River east of Cameron. In January, 1948, there is substantial evidence that at least 700 elk made this trek. Three hundred and three of these animals were checked out by hunters during an extended season, and 323 were counted on the ground after the season closed. The only available forage during the critical winter months is a narrow stringer of open south exposures which is adjacent to valuable agricultural lands. Naturally the elk will not remain on these slopes when there are hayfields and haystacks conveniently at their

disposal. This area has been a major problem area and the State of Montana has had considerable expense coping with it.

It was felt by observers in the field that this migration could be controlled. Aerial reconnaissance kept the elk located until January 6th, when a ground crew snowshoed into Cache Creek Ranger Station. The elk rendezvous on three stringer ridges before the group gets large enough to attempt the pass. The most effective approach to the elk was to come down the ridges and force them back into Meadow Creek or Taylor Fork. The groups were small but persistent. Every day there were elk to herd. The success of this undertaking can be attributed to the fact that the constant agitation did not let the elk get concentrated on the approach area to the pass. The elk, however, did not "spook" back in the same direction from which they came without considerable maneuvering. When approaching the pass, the elk were determined to go on through. After approaching them from above, they had to be trailed into the timber. After they went into the timber, they would either spread out or swing back toward the pass. Each time they were disturbed, they broke up and the leaders had to be followed until they were turned and convinced that they weren't getting over the pass. In several instances the few leaders had to actually be played out before they would turn away from the pass. On January 31st there were eight inches of fresh snow which made the total of 40 inches. With the additional snow and discouraged elk, the two men left Cache Creek Ranger Station. The experimental herding was successful. Only five elk were killed in the Bear Creek area during the open season. During the week of March 14, 1949, a big game census was conducted on the Madison and only 25 elk that could be considered as migratory were counted in the Bear Creek area.

CONCLUSIONS:

1. The elk in the West Gallatin River Drainage wintered exceptionally well despite the excessive snow during this past winter, 1948-1949, as

indicated by 1.27 per cent winter loss.

2. Particular attention will have to be given sex ratio to determine accurately herd composition.

3. The Gallatin Elk Herd has to be continually under observation to determine its size because of summer intermingling with the Northern Yellowstone herd and winter migrations into the Madison.

4. Over a period of 10 years, 1938 to 1948, there have been tagged 412 elk calves of which there have been 75 returns, an 18 per cent recovery. Seventeen and one-half per cent being the accepted herd increase figure, indications are that there has been lost by hunter utilization and winterkill only the annual increase of the herd over this ten-year period.

5. Of the 75 tag returns, 54 were recovered on the Gallatin, 7 on the Yellowstone, 12 on the Madison, 1 from Idaho and one unknown. During the winter of 1947-1948 it is known by count that nearly 700 elk migrated from the Gallatin to the Madison. If 16% (12 of the 75) tag returns represents 700 animals, proportionately 9% (tag returns from the Yellowstone) represents 394 animals, or the number of Gallatin elk drifting into the Yellowstone. However, of the 63 calf elk tagged in the past two years on the Yellowstone, none have been returned on the Gallatin. As these animals reach maturity and begin drifting for themselves and returns of Yellowstone tags from the Gallatin begin, the reverse intermingling can be calculated. Over a period of years other methods showing the same type information, the relationship between the Northern Yellowstone and Gallatin elk herds, will be definitely determined and predictable.

6. The more intense calf-tagging program to be undertaken this spring (1949) whereby individuals can be identified any time of the year observed will give rapid herd relationship data as well as other biological information

pertinent for proper game management.

7. Expectant hunter utilization for the 1949 season. Being unable to determine herd composition during the summer, therefore not knowing the actual calf crop, the accepted annual herd increase figure of 17.5 per cent must be used to calculate actual numbers as follows:

21% calf crop represents 17.5% annual increase.
21% calf crop from a herd of 1,700 elk is 360 calves.
1,700 plus 360 equals 2,060 huntable elk.
360 calves in a herd of 2,060 elk represents 17.5 per cent annual herd increase.

To decrease the total population to the present accepted range-carrying capacity of 1,500, an additional 200 elk will have to be removed, along with the annual increase of 360, or 560 elk. To winter 1,500 elk without winter loss is practically impossible, so we will have to enter the winter with 1,621 animals if a 7.5 per cent winter loss is contemplated. Five hundred sixty elk surplus, minus 121 winter loss leaves 439 elk for hunter utilization.

8. From the success of the experimental herding in Cache Creek Pass, it should be a necessary procedure each year until the elk lose the urge to drift out of the Gallatin.

RECOMMENDATIONS:

1. The hunter take for the 1949 West Gallatin Canyon season be set at 450 head.

2. The elk season at the mouth of the Gallatin Canyon be extended to February 15 on the east side of the river, and have the west side of the river closed in concurrence with the Canyon season.

3. The elk season on the Bear Creek area on the Madison River be the same as the 1948-49 season.

4. A game-checking station should be maintained with the cooperation

of the Yellowstone National Park service on Grayling Creek as well as the usual station at Squaw Creek in cooperation with the Forest Service.

5. Provisions be made for a two-man crew to herd elk out of Cache Creek Ranger Station during the month of January (1950).



STATE Montana

PROJECT 27-D

DATE January 15, 1950

QUARTERLY PROGRESS REPORT

FOR

DEVELOPMENT PROJECT

As Required By

FEDERAL AID TO WILDLIFE RESTORATION ACT

MONTANA FISH AND GAME DEPARTMENT

1. Title of Project: Sun River Game Range Development
2. Personnel: Bruce Neal, Unit Manager, Wildlife Restoration Division
Bob Neal, Asst. Unit Manager, Wildlife Restoration Div.
Elmer Smith, Laborer
John Maphis, Laborer

3. Report of Progress:

A. Fence Construction

Two and one-half miles of fence were completed. This fence is a jack-leg type constructed of 6" to 10" timber. Posts are placed at one-rod intervals with a deadman anchor every ten rods. Four wires were used with a pole along the top.

Two miles of old fence were removed and rolled. The unusable posts were hauled into headquarters for use as firewood.

B. General Construction

1. One cattleguard was constructed across the access road that borders the south side of the range. This guard consists of steel



and concrete.

2. At the headquarters office new floors were laid, windows were replaced and a complete remodeling of the kitchen was accomplished. All exterior and interior painting was finished.
3. A frost-proof underground cellar, 15' x 15' in dimensions, was constructed at the headquarters station.

C. Other Activities

1. Firewood was hauled and sawed to be used at the headquarters camp and at auxilliary camps at Willow Creek and Sun River.
2. The camp at Willow Creek was completely caulked for winter use.
3. Hay was baled, hauled, and stacked at the camps where it is to be used this winter.
4. Food supplies for winter were distributed to the auxilliary camps.
5. Some time was spent driving the elk onto the winter range.
6. Two old buildings were torn down and removed.

Submitted by:

Bob Neal, Assistant Manager
Wildlife Restoration Division

STATE Montana
PROJECT 1-R
DATE January 15, 1950

QUARTERLY PROGRESS REPORT
FOR
SURVEYS AND INVESTIGATIONS

As Required By

FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Title of Project: Wildlife Surveys and Management
2. Project Personnel: Merle Rognrud, Asst. Big Game Biologist, Wildlife Restoration Division

Don L. Brown, Asst. Big Game Biologist, Wildlife Restoration Division

Lloyd McDowell, Unit Biologist, Wildlife Restoration Division

L. E. Brown, Fieldman, Wildlife Restoration Division

1. Title of Project: Blackfoot-Clearwater Game Range Predevelopment Survey
2. Project Personnel: Lloyd E. McDowell, Unit Biologist, Wildlife Restoration Division
Frank Gummer, Field Assistant (2 months)
3. Report of Progress:

INTRODUCTION:

Much of this quarter was spent on general field inspection to help the project leader get acquainted with the land within the scope of the survey. An effort was made to visit each section at least once by either jeep, horse-back or on foot. During this general coverage, information on fall game populations, migration trends, and hunting pressures was obtained. During December, field assistant Frank Gummer helped in a number of ways, especially by setting up some permanent census strips that can be run from year to year.

FINDINGS AND ACCOMPLISHMENTS:

The first basic job to do was prepare a good map of the area. This was accomplished with the help of the Forest Service personnel. A 2 inch-to-the-mile aerial mosaic was made from Forest Service aerial photos. From this original, other maps were then prepared as follows:

1. 2 inch-to-the-mile aerial, showing land ownership.
2. 2 inch-to-the-mile base map.
3. 1 inch-to-the-mile aerial map for general field use.
4. $\frac{1}{2}$ inch-to-the-mile base map (multilithed).
5. $\frac{1}{2}$ inch-to-the-mile base map showing land ownership (multilithed).
6. Other maps showing fall game distribution are being prepared.

To help collect accurate weather data, the U. S. Weather Bureau cooperated by installing a station at the ranch headquarters. Permanent weather

records are now being taken daily by ranch personnel.

To obtain information on the amount of game within the ranch boundaries before hunting season, fifteen census strips were run on September 22, 1949. A total of 34 whitetail deer, 1 black bear, and 7 elk were seen. Twenty-two blue grouse, 8 ruffed grouse, and 142 ducks were also counted. The fieldmen estimated they covered an area of 1050 acres. The total area to be sampled consisted of 6,400 acres, thus the following results were concluded. Approximately 22 whitetail deer and 4.2 elk to the square mile were estimated to be on the area sampled.

It is felt that many deer and elk left the ranch before the regular big game season, due to the disturbance created by the early duck season. A number of the above strips were repeated during the hunting season, but no game was observed. A total of only 6 elk and 3 whitetail bucks were known to have been killed on the above mentioned area during the entire hunting season. However, the big game kill throughout the region was low due to the mild weather that continued throughout the hunting season. Both deer and elk remained in the high country until after the first part of December.

The general migration of deer and elk started in full about the middle of December. The first elk arrived on the ranch on the 19th. About 20 head circled the large meadow and bedded on the east side of Boyd Mountain. Trails of many deer were also observed, all coming from the high country. On this date there were 6 inches of snow at the ranch and 16 inches at Cottonwood Lakes. The temperature during the night had dropped to 12° below zero.

The first elk damage of the season was reported on December 20 by Mr. Hendrix, a neighboring rancher to the north. He stated that approximately 50 head of elk had done considerable damage to haystacks within 300 yards of his farm buildings. Two stacks were fenced with mesh wire to a height of

eight feet by Fish and Game personnel that afternoon.

To help draw and hold the elk on the game range, two small haystacks were made, one at Johnson Spring and one at the head of the big meadow. Along with the hay, both salt blocks and protein concentrate cakes were put out.

Two types of salt were used--white and calcium phosphate. The elk seemed to have a great preference for the latter. Heavy use was noted, especially the first night or two as each new herd moved in. Little use was noted on the white blocks. Each herd showed the same preference for calcium phosphate as they arrived on the range.

As was discovered in the Bitterroot last season, the elk seemed to crave molasses protein cake. A new formula designed for big game use was worked out with the cooperation of the Centennial Flour Mills Company of Missoula. This cake had a protein content of 22.1 per cent and contained .96 per cent calcium and .86 phosphorus.

A general plan was developed to draw the elk to the excellent wintering range in Elk Basin west of Sperry Ridge and Boyd Mountain. A bobsled, drawn by a heavy team, was used to extend a thin line of hay and molasses cake from the big meadow to Elk Basin. Sixteen bales of hay and 200 pounds of cake were used to make approximately 4 miles of feed line. The elk followed this line a little farther each night and by the end of the first week were feeding along its entire length. By manipulation of this feed line, a good distribution of elk and mule deer is hoped to be maintained on the winter range. This same method is being used to draw elk away from neighboring ranches, with the hope that they will eventually all end up on the desired winter range.

During the first part of December, Frank Gummer located and blazed a

number of permanent census strips in the vicinity of Boyd Mountain. Four section corners were relocated and marked. This work will be continued during February.

To date all game seems to be in excellent condition. The use of molasses protein cake seemed to increase the use of browse near the feed line. Use of fir needles by mule deer was noted to be quite heavy, even when other browse and forage was plentiful.

CONCLUSIONS AND RECOMMENDATIONS:

1. It is recommended that the Department cooperate with ranchers adjacent to the game ranch in getting their haystacks fenced so they are completely elk-proof. This is necessary to force the elk past the ranches on to the game range.
2. Drift fences should be built in a number of places so trespass stock can be kept off the vital winter range set aside for elk and deer.
3. One or two loose haystacks should be placed at the head of the big meadow to attract elk away from stacks of neighboring ranchers. The hay put in these stacks should be selected for palatability, as the meadow produces a number of different kinds.
4. A permanent feeding station should be established in Elk Basin. Baled hay could be stored there to reduce the heavy load needed when all the hay is stored at the main headquarters.
5. Repair of the present telephone would help coordinate work with the Helena office.

Submitted by:

Lloyd E. McDowell, Unit Biologist
Wildlife Restoration Division

QUARTERLY PROGRESS REPORT
FOR
SURVEYS AND INVESTIGATIONS
As Required By
FEDERAL AID IN WILDLIFE RESTORATION ACT

1. Titles of Projects: A Big Game Management Study in the Continental and Adjacent Units.

Forage Utilization Studies in the Flathead River and Swan River of the Continental and Kalispell Units.

Elk Harvest Check in the West Side of the Bitterroot River Hunting Area.

Post-hunting Season Check of Whitetail Deer Sex and Age Ratios in Fish Creek, Thompson River and Swan River.

A Second Winter Investigation of the Cherry Creek Game Preserve and Adjacent Areas in the Clark Fork Unit with Special Emphasis on Elk Forage Utilization in the Preserve, Elk Census, and the Distribution of Elk.

2. Project Personnel: M. J. Rognrud, Project Leader, Wildlife Restor. Div.

Frank Gummer, Field Assistant, " " "

Pete Danielson, Field Assistant, " " "

Jack Howard, Temp. Field Assistant, " " "

Other part-time personnel: Jack Schmautz, George Goers, Deputy Game Wardens Ammerman, Howard, Cheney, and Watt.

3. Report of Progress:

INTRODUCTION:

About one-half of the quarter was spent in the field obtaining the fall linear growth measurements for the forage utilization studies. The management study of big game, begun a year ago, was terminated by the near completion of the final report at the end of this quarter. A sex and age ratio count of

whitetail deer was made in December. The elk harvest in the west side of the Bitterroots was checked during the entire quarter. Preparations were made for the second winter of elk investigations in the Clark Fork Unit.

FINDINGS:

Big Game Management Study

Elk were counted by repeated tallies during the winter of 1948-49 and whitetail deer in the Swan River by a modified strip census method. Other big game were enumerated incidental to the census of the mentioned species.

The 1948-49 elk census is briefly summarized below:

<u>Elk Herd</u>	<u>Elk Seen</u>	<u>Estimated Count</u>
Sun River	2,850*	2,920
South Fork	1,884	2,450
Middle Fork	529	720
Swan River	202	280
Totals	5,465	6,370

*Elk seen in the Sun River includes about 2,000 elk known to be on the Sun River Game Range.

The density of elk averaged 9.3 animals per square mile of winter range. About 6,000 whitetail deer were estimated in the Swan River by the strip census.

The population trend of the elk herds in the Continental Unit has been a decrease since the 1930's to the present, nearly stable population.

The productivity of the elk herds, based on the classified count was a 14 per cent herd increase as compared to a 27% increase recorded during the mild winter of 1941-42. The calf-cow ratio averaged 1:5.4 in the study area in 1948-49.

Elk harvests averaged 1,309 animals annually in the study area, while the counts averaged 7,021 elk between 1930 and 1949. The population-kill ratio was 17 per cent. A kill-area ratio of 1.02 elk per square mile of hunt-

ing area was found in the Sun River, .33 elk in the South Fork and .44 elk per square mile in the Middle Fork.

Natural losses were estimated to be 9 per cent of the elk herds in 1948-49, a normal winter. Whitetail deer losses were estimated to be 13 per cent of the herd.

Elk winter range in the study area totaled about 687 square miles---about 200 square miles in the Sun River, 305 in the South Fork, and 70 in the Middle Fork. In the Swan River about 112 square miles are sparsely occupied by elk.

Based on forage utilization studies and the most recent data on carrying capacity, the elk winter ranges in the Flathead are currently overstocked. A reduction of about 500 elk in addition to the usual annual harvest would be desirable.

The winter ranges show evidence of past over-utilization by elk. The present trend is a continuation of the effects of slight over-browsing in the Flathead.

RECOMMENDATIONS:

1. A periodical census of elk and whitetail deer.
2. Annual determination of the population status of these two species.
3. A range survey is needed to determine the present carrying capacity for the winter ranges.
4. Forage utilization studies be improved and expanded for determining the trend in range condition.
5. Adjustment of the numbers of elk and whitetail deer so that the winter ranges receive a proper utilization.

Forage Utilization Studies

The fall linear measurements of annual growth were made of 106 plots, in

each of which 4 branches of key plants were tallied. The plots are located in the Flathead River, Swan River, Bitterroot River and in the Cherry Creek Game Preserve. The available forage data has not yet been compared for the years 1948 and 1949, but field observations suggest the 1949 growing season resulted in a lesser production of forage.

Utilization of forage reported for the winter of 1948-49 amounted to 65 per cent with one-half of the plants over-utilized on the Flathead elk winter ranges, where a 60 per cent average utilization with one-third of the plants over-utilized was tentatively considered to be proper utilization.

Elk Harvest Check--Bitterroots

A periodical check was made of the elk killed by hunters in the west side open area. This was accomplished by contacting local residents. The tabulated elk harvest, believed to be conservative, amounted to about 420 animals during the October 1 to December 31 hunting season.

Whitetail Deer Sex and Age Ratio

During December 1949 a sex and age ratio count of whitetail deer in three important hunting areas yielded the following results:

<u>Hunting Area</u>	<u>Buck</u>	<u>Doe</u>	<u>Fawn</u>	<u>Buck-doe Ratio</u>	<u>Fawn-doe Ratio</u>
Fish Creek	15	47	47	1:3.0	1:1.0
Thompson River	6	18	23	1:3.0	1:0.8
Swan River	7	31	34	1:4.4	1:0.9

Difficulty was experienced in obtaining a satisfactory count of classified animals.

Second Winter Investigation of Elk in Cherry Creek

Field preparations were made for elk census work to be conducted in the Clark Fork Unit in January. Ten browse utilization plots were established in the Cherry Creek Game Preserve during November.

EASTERN MONTANA SURVEYS & INVESTIGATIONS

PERSONNEL:

Don L. Brown, Assistant Big Game Biologist, Wildlife Restoration Division

L. E. Brown, Fieldman, Wildlife Restoration Division

INTRODUCTION:

Due to the number of surveys and incidental investigations that were made in Eastern Montana during the past quarter, a synopsis of work accomplished in each management unit will be made rather than a separate report for each project.

FINDINGS:

BLAINE UNIT

Two hundred eighty-eight antelope were transplanted into the southwestern part of the unit.

Approximately 100 head migrated to some cultivated areas, which immediately brought complaints from the landowners. This group was successfully herded (by airplane) back to the desired planting site, a distance of seven to ten miles. Subsequent investigations in this area revealed no evidence of their returning to the cultivated lands.

FERGUS & PHILLIPS UNITS

Fort Peck Game Range Area

A total of 466 deer were checked through stations operated in the vicinity of the Fort Peck Game Range. Of the twenty-nine deer removed, 6 per cent were whitetail and 94 per cent were mule deer. The over-all hunter success for this region was one deer per 2.08 hunters or 47.9 per cent of the hunters were successful. Sixty-four per cent of the deer killed were taken during

the first three days of the season.

Age classes of the kill in this area were in the following proportions:

28%	1½ years
27.7%	2½ years
31.7%	3½-4½ years
16.6%	5½ years and over

Sex ratio data gathered before and after the hunting season are shown in the following table:

Sex Ratio Summary

Pre-season	Bucks	Does	Fawns	Uncl.
Whitetail	19	29	18	61
Mule Deer	28	47	33	30
Total	47	76	51	91
% of Comp.	27.0%	43.7%	29.3%	
Ratios	B:D :: 1:1.62	D:F :: 1:0.67		
Post-season				
Whitetail	6	12	8	22
Mule Deer	32	57	55	1
Total	38	69	63	23
% of Comp.	22.4%	40.6%	37.0%	
Ratios	B:D :: 1:1.82	D:F :: 1:0.91		

GLENDIVE UNIT

A total of 314 hunters checked 64 deer through checking stations operated near Glendive. Eighty-five per cent of these deer were whitetail. Age groups in this area were in the following proportions:

20%	1½ years
38.9%	2½ years
31.1%	3½-4½ years
10.0%	5½ years and over

Two instances of wildlife depredations (deer and antelope) on cultivated crops were investigated for the purpose of including these in the management problem.

POWDER RIVER UNIT

Information gathered on pre and post-season sex ratio checks and checking station data is as follows:

Pre-season sex ratio:
Buck-doe ratio 1:3.46
Doe-fawn ratio 1:0.91

Post-season sex ratio:
Buck-doe ratio 1:4.90
Doe-fawn ratio 1:1.35

Post-season sex ratio check was made subsequent to regular buck season and special either-sex season.

Checking stations checked 290 hunters with 94 mule deer. Proportions of age classes were as follows:

34%1½ years
28%2½ years
27%3½-4½ years
10%5½ years and over

The special permit, either-sex season on deer in the Custer National Forest was periodically checked to determine hunter success. Early and incomplete returns indicate approximately 80% were successful.

CUSTER UNIT

Investigations of antelope transplanting sites were made in this unit. As a result of these investigations, antelope were transplanted into the Spring Creek, Reservation Creek, and Froze-to-death Creek areas--a total of 266 antelope were released.

MISSOURI BREAKS

An unsuccessful attempt was made to trap Rocky Mountain bighorns from the Billy Creek enclosure. The attempt was made for the purpose of releasing a selected group from this pasture into the immediate area.

FERGUS UNIT

Two and one-half days were spent posting the South Moccasin Game

Preserve.

One truckload of antelope was released in the central part of this unit.

MUSSELSHELL UNIT

During the past quarter 623 antelope were trapped from this unit. Thirty-seven head (5.9%) were lost in trapping and transporting.

Pre-season aerial sex ratio check showed a ratio of one buck to 3.97 does and fawns. Post-season sex ratio check, based on trapping operations, showed a ratio of one buck to 4.42 does and fawns.

A one-day hunter-success checking station was operated at Lavina. Of these hunters checked, 71 per cent were successful in killing an antelope on the first day.

Several moderately successful attempts were made to drive antelope by plane from cultivated fields to grazing lands.

An aerial check was made to determine the accidental hunting loss subsequent to the antelope season. The numbers found led us to believe this factor is negligible to future management.

Several of the pinioned geese that migrated from the Miller Lake Refuge were located by use of the airplane.

YELLOWSTONE UNIT

Aerial reconnaissance was made in this unit to determine the best location for setting up the antelope trap.

LITTLE BELT UNIT

Several investigations were made to determine best management practice to use in coping with the economic conflict between ranching and big game

interests, in this area.

Recommendations and conclusions will be included in the regular project reports.

Submitted by:

Don L. Brown, Assistant Big Game
Biologist

L. E. Brown, Fieldman

Wildlife Restoration Division

January 5, 1950

BLAINE-PHILLIPS-GLASGOW UNITS

International Antelope Census

DATES:

April 18-27, 1949

PERSONNEL:

Al James, Canadian Pilot

Art Bresse, Field Officer, Alberta, Canada

Robert Blackwood, Field Officer, Saskatchewan, Canada

George Sturtz, Jr. Field Asst., Wildlife Restoration Division

Lawrence Brown, Fieldman, Wildlife Restoration Division

Don L. Brown, Asst. Big Game Biologist, Wildlife Restoration Division

PURPOSE:

This investigation was proposed to determine the antelope population that "migrates" between Canada and the State of Montana. As the officials in both the Provinces and the State of Montana had only an estimate of this herd, total numbers were necessary for its proper management.

INTRODUCTION:

The antelope herd that apparently drifts between the Canadian Provinces and Montana was assumed to be in an area of 5,750 square miles. This area varied in width in Saskatchewan from 6 miles to 30 miles north of the border, in Alberta 30 miles north of the border, and in Montana from 6 to 12 miles south of the border.

Antelope that would be farther south of the 6 or 12-mile census area in Montana were not to be considered as part of the migrant herd, at least during this year, nor were those farther north of the 6 to 30-mile strips in Canada.

Herds in Canada, that are north of the Canadian Pacific Railroad, are not likely to drift south because of a double post-and-rail fence along the right-of-way.

In general, the census area in Canada is comprised of many community pastures, which are used exclusively for grazing. This is especially true from the town of Manyberries, Alberta, east to West Poplar, Saskatchewan. The region west of Manyberries and near Lake Pakowki has been developed into an agricultural community.

In the census area of Montana, the main farming regions are between Whitewater Creek and Hogeland, and that area west of the Milk River. The grazing lands of this region are low, rolling, dune-like hills. The main cover type is the short-grass prairie, with sage species occurring in creek bottoms and in snow pockets along the ridges. However, many of the areas have been disturbed by homesteading and crested wheatgrass was introduced when they were reclaimed for grazing.

PROCEDURE:

The census started on the 18th of April at the West Poplar Port of Entry and terminated on April 29th. Areas were stripped by airplane in a north-south direction, progressing westward to the Sweetgrass Hills. Strip widths were approximately one mile, but as light conditions and terrain varied, strips were regulated by these factors.

Areas for censusing were outlined as work progressed in order to make return-to-base flights as short as possible for the two census crews.

Information acquired on the survey was tallied for each strip. For instance, strip one began at 6:45, direction south, all information recorded in order of occurrence of that strip. Strip two, direction north etc. (See sample sheet) By recording in this manner, flight lines can be plotted,

BROWSE PRODUCTION ON FIVE DEER WINTER RANGES
IN LINCOLN COUNTY

DATE:

July, 1949

PERSONNEL:

Fred Johnson, Wildlife Management, U. S. Forest Service

Ade Zajanc, Assistant Unit Biologist, Wildlife Restoration Division

Jack E. Schmautz, Unit Biologist, Wildlife Restoration Division

PURPOSE:

The intent of this study was to determine the production of deer food by weight on five winter ranges of Lincoln County, three of which had been logged in the past and the other two still in the virgin condition.

Originally, it had been planned to study both heavily and lightly used deer winter ranges that had been logged-off one to ten, 11 to 20, and 21 to 30 years ago, or are still unlogged. However, no cutover ponderosa pine stands could be found that showed light winter use by deer. Therefore, the study was modified somewhat and only three heavily used cutover areas and two virgin areas, one heavily used and the other lightly used were studied.

PROCEDURE:

Description of Area. The areas sampled, year logged and intensity of use by deer are shown in Table 1.

These ranges are all in ponderosa pine type and are quite similar as regards slope and exposure. Slope varies from 10 per cent to 30 per cent and the slope is generally south to southwest.

TABLE 1. Deer winter ranges sampled to determine browse food production.

Area	Year Logged	Winter Use by Deer
East Fisher	Virgin	Light
Wolf Creek	Virgin	Heavy
Canyon Creek	1920	Moderate to Heavy
Dunn Creek	1939	Heavy
Wapiti Mountain	1947	Heavy

No climatic records are available for any of the areas studied. However, from observations of the existing vegetation and cover types, the investigators believed that the Wolf Creek range was probably more arid than the rest and the East Fisher more humid.

Method Used. Browse production was estimated by the weight-estimate-by-plot method. Mil-acre plots were set up two chains apart in lines that were one quarter of a mile apart throughout each of the ranges. Sixty plots were set up in each range. The weight of browse on each plot was estimated in ounces and recorded as "low browse," 0 to 18 inches high, or as "high browse", 18 to 60 inches high. Sixty inches was assumed to be the normal height of utilization by deer. Only those stems up to one-eighth of an inch in diameter were considered in estimating the weight of browse produced. This information was recorded on the form shown in Figure 1.

In addition all coniferous reproduction was recorded as to species and per cent of the plot covered.

Two days immediately prior to the study were spent by the party in standardizing the technique used and in practice estimating the important browse species. While this is admittedly too short a period of practice for best results, it is felt that the results obtained are at least indicative

average strip width determined, and a land-use classification given to each strip. Antelope and reservoirs observed on the entire flight could be plotted for future reference by this method.

A waterfowl census was conducted in this area at the time of the antelope survey; "duck strips" were flown from the Canadian Line to the Milk River. These strips were flown in a north-south direction at 12-mile intervals; all waterfowl observed on a quarter-mile strip and all reservoirs in a two-mile strip were recorded. At the same time all antelope on a one-mile strip were tabulated. This additional antelope data was gathered to augment the survey that included only those antelope 12 miles south of the Canadian Line.

FINDINGS:

A total of 5,317 antelope were counted on this joint census. In Saskatchewan, 1,988 antelope were counted in 2,340 square miles of .85 antelope per square mile. Alberta counted 2,329 antelope in 1,260 square miles or 1.85 antelope per square mile. The area censused in Montana consisted of 2,141 square miles, in which 1,093 antelope were counted or .51 antelope per square mile. (See Figure 1 and Table I)

TABLE I
MONTANA FLIGHT RECORD

Location	Antelope	Area Sq. Mi.	Ant./ Sq. Mi.	Reservoirs	Reservoirs / Township
Opheim-Rock Creek	22	252	0.09	22	3.1
Rock Cr.-Frenchman Cr.	120	228	0.53	26	4.1
Frenchman Cr.-Morgan	61	290	0.21	38	4.8
Morgan-Chapman	14	164	0.09	11	2.1
Chapman-Turner	18	144	0.12	16	4.0

TABLE I (Continued)
MONTANA FLIGHT RECORD

Location	Antelope	Area Sq. Mi.	Ant./ Sq. Mi.	Reservoirs	Reservoirs / Township
Turner-Hogeland	24	122	0.17	2	0.5
Hogeland-Hydro Rd.	131	198	0.66	48	8.8
Hydro-Rd.-Battle Cr.	233	147	1.58	42	10.0
Battle Cr.-Woodpile- Coulee	98	77	1.27	12	6.0
Woodpile Coulee- Willow Cr.	65	90	0.72	16	6.4
Willow Cr.-Wildhorse	240	198	1.21	26	4.5
Wildhorse-Milk River	48	47	1.02	6	4.6
Milk River-111 ⁰ Long.	19	162	0.11	0	0.0
TOTAL	1,093	2,141	0.51	265	4.5
Average Group - 3.66 antelope					

The Blaine Big Game Management Unit had the majority of Montana's antelope. Here 855 were counted--their favored range being between Cherry Ridge and the Milk River.

The area censused in Blaine Unit is approximately 45 per cent of the entire sub-unit, and contains the main summer range for this antelope herd. During the winter months, the antelope of this area band together along Battle Creek and Lodge Creek and drift southeast toward the breaks of the Milk River. A winter check in this unit was made during February and March, and 834 antelope were counted. The winter check and summer counts are reasonably close for a biological census. It would also prove that during the past winter there was little or no drift of Canadian antelope to Montana.

The average group size during this survey was 3.6 antelope and most

of the antelope were observed in close proximity to water. The abundance of water from creeks and a greater number of reservoirs in this area may be one of the major factors contributing to larger numbers of antelope in Blaine Sub-unit I.

An estimate of the total antelope population determined by observations made on the duck strips, would indicate there are approximately 900 antelope in this management unit. (See Table II). This agrees with the counts and estimates of the past winter and the present antelope survey. These duck strips were flown north and south from the Canadian line to the Milk River. The north-south direction of these strips is the most desirable direction with regard to antelope, because agricultural areas diminish going north from the Milk River. Thus strips form a fair sample of the entire area.

TABLE II
ANTELOPE OBSERVED ON DUCK CENSUS
(Blaine Management Unit)

Strip No.	Antelope Observed	Length of Strip	Location
3	30	34 miles	2 mi. west of Turner
4	0	36 miles	Edge of Alkali Lake
5	0	30 miles	5 mi. west of Harlem
6	5	28 miles	3½ mi. east of Chinook
7	41	28 miles	2 mi. west of Turner
8	8	36 miles	Lodge Creek
9	3	30 miles	East end Wildhorse Lake
Total	87	222 miles	

Blaine Management Unit: (Sub-unit 1) AREA 2,296 Sq. Miles

$$\frac{2296 \text{ sq. mi.}}{\bar{X} \text{ antelope}} = \frac{222 \text{ sq. mi. observed}}{87 \text{ antelope observed}} \cdot X = 900 \text{ antelope.}$$

CONCLUSIONS AND RECOMMENDATIONS:

This census established the "International Herd" population and their main ranges. In Montana, the Blaine Management Unit has the main huntable antelope herd (900 antelope). The area of this unit is 2,300 square miles; even though all of this area is not antelope range, the area is under its carrying capacity. Hunting on this region should be limited to the hunting of bucks only and for 100 to 150 permits. The hunting of bucks will not effect the productivity of the herd and the number removed would be lower than the annual increase. The antelope in northwestern Valley and northeastern Phillips Counties are below huntable numbers at the present time. This latter area should remain closed to allow this herd to reach a higher level before it is again hunted, as there is adequate range for a large herd.

Canadian officials, from both Provinces, discovered their antelope populations were smaller than previously estimated. At the present time antelope are hunted by general open seasons. Both Canadian officials were of the opinion that hunting regulation in their Provinces would have to be changed.

During winters of crusted snow and severe temperatures, antelope have moved from Canadian ranges to Montana. Migration or drifting of Canadian antelope to Montana is probably responsible for the sportsman's opinion of a greater antelope population in Montana than exists. Because of these opinions and the inadequate information on antelope numbers, hunting seasons in northern Phillips and Valley Counties have been premature.

Poaching was reported in several areas and with the limited size of these herds, it is considered to be a major factor in retarding the increase. Lack of other big game in this region makes antelope the major species to be poached.

Depredation from coyotes is nil or nonexistent at the present time. One coyote was observed in Montana during the entire census. In comparison, eight coyotes were observed while driving from Havre to Wildhorse in 1946.

It is recommended another meeting of the interested parties of Saskatchewan, Alberta and Montana be held to discuss a coordinated management plan.

Submitted by:

Don L. Brown, Asst. Big Game Biologist

Larry E. Brown, Fieldman

Wildlife Restoration Division

September 14, 1949

SAMPLE SHEET

(Figure 1)

MONTANA FISH AND GAME DEPARTMENT

Date _____ ANTELOPE AERIAL STUDY Fl. No. _____

Fl. Boundaries: Woodpile Coulee--East Unit Blaine
Willow Cr. Rd. --West
Sub-unit 1

Take Off 6:00 A.M. Land 8:10 A.M. Flying Hrs. 2-10 Time on Strip

Weather Visibility Av. Alt. Strip Width

Unclass. Reservoirs Does Fawns Time Remarks

2 2 . . 6:14 → South (Strip direction)

2 5

3 3 6:21 → North

5 5

2 . . 6:27 → South

2 2 6:33 → North

3 6

2 3

3

4 3 . . 6:38 → South

3 1 . . 6:46 → North

2

6:53 Off strip -- duck census

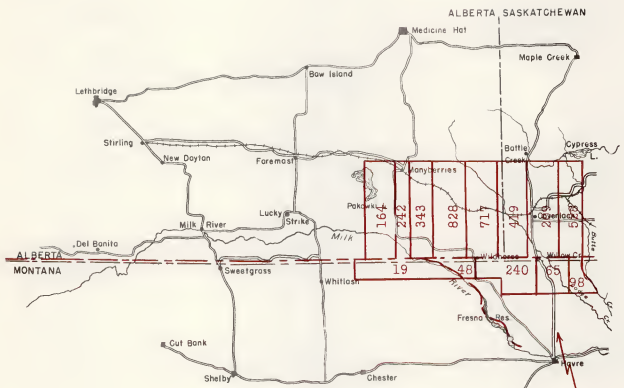
63

16

6 strips .8 miles . . strip
width 1.3 mi.

Pilot _____

Observer _____



Legend

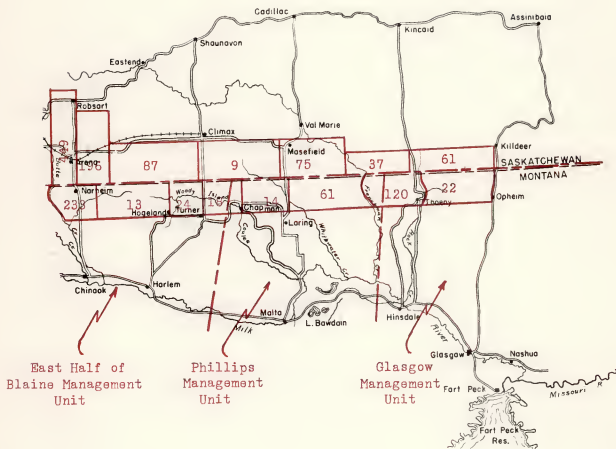
- Flight Boundaries
- Boundries of Management Units and State

Scale. — = 16 miles

West Half of
Bitter Management
Unit

INTERNATIONAL ANTELOPE CENSUS

APRIL 1949



BIG BELT - BOULDER UNIT
Limestone Hills Deer Sex Ratio and Classification Count
(Broadwater County)

DATE:

December 17, 1949

PERSONNEL:

Faye M. Couey, Big Game & Lands Biologist, Wildlife Restoration Div.
Merle Rognrud, Asst. Big Game Biologist, Wildlife Restoration Division
Dick Hodder, Range Technician, Wildlife Restoration Division
Joe Gaab, Unit Biologist, Wildlife Restoration Division
Bert Angstman, Fieldman, Wildlife Restoration Division

PURPOSE:

This count of deer has been made for the past three seasons following hunting and during rut when best sex ratios are obtained. The area lends itself to this purpose because the first storms push them out onto this ideal winter range.

The area was closed in 1947 because local sportsmen objected to excessive kills. This fall deer damage complaints have created additional interest in the area. The status of the herd and the range is therefore extremely important at this time.

PROCEDURE:

Coverage was made as in previous years, whereby an area of 4 or 5 square miles north of the Dowdy (Harris) ranch was counted. Two men covered the highest reef near the "Old Woman's Grave" which was not covered in previous counts. Travel was on foot and binoculars were used. Groups were classified as such, although some of them merged before complete classification was made.

FINDINGS:

There were about 2 inches of fresh snow and the weather was mild but overcast. Conditions were good for classifying deer and apparently the winter concentration was well along.

Table 1. Comparative Summaries

Season	Bucks	Does	Fawns	Unclass.	Total Class.
1947-48	51	128	82	69	261
Percentage	19%	44%	31%		
1948-49	62	189	145	16	396
Percentage	18%	46%	35%		
1949-50	87	261	171	-	519
Percentage	17%	50%	33%		

There were 519 mule deer seen, consisting of groups ranging from 5 to 25. Bucks were in the vicinity of the does although rut seemed to have been concluded. Several very large antler spreads were observed.

The buck-doe ratio is 1 to 3, the same as a year ago. However, of the 82 bucks seen, 46 were long yearlings which number is considerably larger than last year.

Three very small fawns were seen, one having spots. One fawn was observed with a hind leg shot off at the hock.

An old shed whitetail antler was found which was rather surprising as this has always been considered purely mule deer range.

Two coyotes and several tracks were observed, indicating that they are not totally eliminated from this area.

Seven moose have been reported on Crow Creek, near Radersburg.

Range conditions were fair. Grass growth is quite short due to the very dry growing season. Browse and weeds were correspondingly short, presenting less forage than usual this winter. Current use was quite obvious on the

mountain mahogany, and some of the plants on the south exposures presented a hedged appearance.

The hay meadow on the Dowdy Ranch is quite an attraction to the deer as evidenced by heavy trails in the snow. There were several complaints of damage earlier in the fall, but the Fish and Game Department supplied material and some labor while local sportsmen turned out and fenced the stock yards. This stopped the complaints.

CONCLUSIONS AND RECOMMENDATIONS:

1. The Limestone Hills Big Game Closure was established for a limited period. The fact that the deer winter range is showing signs of overuse and there are deer damage complaints from the adjoining area, indicates that the population wintering there is too large. The sex ratio and percentage of young indicate that this herd is not being overhunted--in fact it should be hunted more. Large numbers of deer were present in this area as early as November 1st. It is therefore recommended that this closure be abandoned until such time as conditions warrant its re-establishment.

Submitted by:
Faye M. Couey, Big Game & Lands
Biologist
Wildlife Restoration Division



FLATHEAD-SUN RIVER UNIT

Big Game Sex and Age Classification and Range Investigations

Sun River Area

DATE:

December 18 - 19, 1949

PERSONNEL:

Ken Thompson, Assistant Director, Wildlife Restoration Division
Faye Couey, Big Game & Lands Biologist, Wildlife Restoration Division
Merle Rognrud, Asst. Big Game Biologist, Wildlife Restoration Division
Richard Hodder, Range Technician, Wildlife Restoration Division
Robert Neal, Fieldman, Wildlife Restoration Division
Bert Angstman, Fieldman, Wildlife Restoration Division
Wm. Eckerson, Special Warden
Doug Morrison, U. S. Forest Ranger
Bud McNeal, Forest Service
Dick McElfresh, Forest Service

PURPOSE:

To determine big game distribution, condition and other pertinent data,
and to find degree and extent of range use.

To get an accurate census and classification of bighorns, particularly
in the Sun River Canyon and vicinity.

To get as accurate as possible sex and age classification for mule deer.

WEATHER:

Four to six inches of fresh snow made a good background for counting
game. Below zero temperatures also helped as game animals were all out in
the open feeding.

PROCEDURE:

Crews gathered at the Augusta Ranger Station on December 18th and made plans for coverage of the Sun River Canyon and Willow Creek areas. Coverage was limited to one day because crews were unable to allow more time from their regular assigned work. Because of this limited time, emphasis was placed on covering at least the main bighorn sheep range and an attempt made to get as many mule deer classified as time would allow.

Excellent cooperation was received from the Forest Service in supplying personnel, food and quarters.

FINDINGS:

The Augusta checking station records indicate 433 elk, consisting of 167 bulls, 164 cows and 102 calves had been checked out when the season closed December 15th. Evidence from local wardens indicates that many elk were not checked through the station making the total kill considerably higher. Additional figures gathered from the field will be added to this kill report.

Also checked through were 468 mule deer bucks and one whitetail buck. There were 4 grizzly and 6 black bear killed in the Sun River area.

Conditions were mild and dry throughout most of the hunting season, with no snow in the high country until early December. As a result, the elk kill was very slow until the last ten days of the season.

Just prior to this count elk were concentrated in large numbers (1,500 estimated) on the North Fork Flats and there were possibly 500 in the Pretty Prairie and West Fork area. Utilization of this intermediate range was fairly heavy. They are at present poised to break for lower country with the first good storm.

On this count there were 41 elk in Hannan Gulch, 50 on Reclamation Flat, 20 in Big George and about 400 on the low Arsenic-Scattering Springs Divide.

Forage use on the Reclamation Flat area was mostly on sedge, Poa, fescue and some Artemisia frigida. Giant rye was untouched. Grass growth was short and the elk had worked it all over completely.

Bighorn Sheep:

Table 1. Bighorn Sheep Seen

Area	Mature Rams	2 & 3 yr. Rams	Ewe	Lamb	Total
Mortimer			1		1
Big George	3	3	19	8	33
Scattering Springs	4		17	7	28
Reclamation Flat	3	4	9	6	22
Spring Mountain	2		6	3	11
Wagner Basin	7	10	17	6	40
Fairview Plateau	1	3	4	3	11
Ford Plateau	1		2	2	5
Total	21	20	75	35	151

Ewe (includes yearlings) - lamb ratio - 1:1.47
 % Lambs of total herd - 23%

Table 2. Comparative Bighorn Sex Ratios

Year	Ewe (including yearlings)- Lamb Ratio	% Lambs of Total Herd
1941	1 - .33	18
1942-44 (2 yr. study)	1 - .41	23.5
1945	1 - .45	18
1946	1 - .53	21
1947	1 - .268	12
1948	1 - .287	16
1949	1 - .47	23

From the above table it becomes evident that the condition of the bighorn sheep herd is very good this year. The ewe-lamb ratio approaches the normal but yearlings were included with the ewes, and because there were few yearlings present, this figure may be somewhat out of proportion. Yearlings were not classified separately because of the difficulty of inexperienced men

to determine them. Scarcity of yearlings reflects the low lamb survival of last year. The percentage of lambs of the entire herd is very good and quite gratifying, considering the extremely poor picture presented the past two seasons.

The total number censused is the largest number seen during the past nine seasons in this counting area.

Condition of bighorns was excellent. No evidence of loss has been reported this year, although a game warden reported seeing several lambs, apparently with scours last summer.

No coyotes were seen and sign was scarce. Probably the reason for this is the presence of elk remains in the adjacent hunting area which was only recently closed.

Five golden eagles were seen in the Canyon area and several mountain lion tracks have been reported from the Pretty Prairie-Patrick's Basin areas.

Mule Deer:

Table 3. Mule Deer Seen

Drainage	Bucks	Yearling		Does	Fawns	Unclass.	Total
		Bucks	Does				
Upper Canyon						21	21
French Gulch	1	2	19	15			37
Norwegian Gulch	1	2	14	10			27
Hannan Gulch	16	12	54	45	-		127
Home Gulch	5	2	53	39	-		99
Wagner Basin	16	7	133	71	-		227
Ford Creek	18		20	19	78		135
Total	57	25	293	199	99		673

Buck - doe ratio - 1 buck to 3.57 does
33% of classified deer were fawns

Of the total classified deer (595) there were 199 fawns, or 33% of the herd. Ratio between bucks and does (yearling does included) was 1 buck to

3.57 does. Of the total classified deer 3% were buck, and 4% were long-yearling bucks.

For purposes of comparison we have the following figures for this area:

Year	Hunter Kill	Total Classified Deer	Sex Ratio	% Fawns
1946	605	880	1 buck to 2.93 does	34
1947	436	547	1 buck to 3.59 does	25.4
1948	202	-incomplete data-		
1949	468	595	1 buck to 3.57 does	33

Dry weather conditions during the entire season made hunting difficult and the deer were widely scattered. In spite of these difficulties, a sizable kill was obtained. Only one whitetail buck was killed, but this species is not numerous in the Sun River area.

Conditions were good for counting as the deer were concentrated on the lower ranges, and fresh snow made visibility good.

CONCLUSIONS:

Winter conditions are probably below normal in severity this year because of light snow and the prevalence of mild, dry weather throughout the fall. Forage growth on low ranges was light.

Elk have concentrated on the intermediate winter ranges but have not attempted to come through to the game range outside the mountains. This is expected any day.

The hunt this year was orderly and the kill about that desired. There was considerable criticism of the effectiveness of the checking station at Augusta and it is felt that quite a number of game animals went out unchecked.

This was found to be true by wardens in the field. A new location might help this situation.

Numerous flukey elk livers were reported, particularly in the Benchmark

area. This might provide a good index to the degree of intermingling of Flathead and Sun River elk, because these flukes supposedly develop only on the west side of the Continental Divide.

Condition of the bighorn appears to be excellent. All sheep seen were in fine shape and no dead ones have been reported. The lamb crop is good and the composition of the flocks is conducive to a thrifty herd.

Mule deer have moved to their winter range and are in good condition. The whitetail deer, although not numerous are located in certain spots and seem to be at a stagnation point. This is probably limited by the amount of their type of range which is available.

Competition between elk and whitetail and between elk and bighorn has been noticeable during severe winters with the smaller species suffering greatest. Since the acquiring of the elk range outside the mountains the elk are not required to remain on these problem areas, but have gotten the habit of migrating straight through. This may prove to be a boon to the mountain sheep and to a lesser degree the whitetail, in relieving them of that periodic struggle for forage.

RECOMMENDATIONS:

1. The checking station should be relocated and possibly two stations established. One station on the Sun River, just outside the forest boundary and another on the Benchmark road near the Willow Creek Road intersection would handle most of the hunters in this area.

2. A determined effort should be made towards predator control on and adjacent to the Sun River bighorn winter range.

3. The present sheep traps are in need of repair. These should be rebuilt but no wire netting should be used. Instead posts should be set and

rigged so that a section of antelope trap netting can be fastened on at the time that trapping is contemplated.

Submitted by:

Faye M. Couey, Big Game & Lands Biologist
Wildlife Restoration Division

MISSOURI BREAKS UNIT

Transplanting of the Bighorn Sheep

DATE:

October 26, 1949

PERSONNEL:

Montana Fish and Game Personnel with the cooperation of local ranchers and personnel from the Fish and Wildlife Service.

PURPOSE:

On November 16, 1947, 16 bighorn sheep from the Tarryall herd of Colorado were released in a holding pasture in the Missouri Breaks area. On October 26, 1949, a count was made of this herd and approximately 30 sheep were counted.

The objective of this project was to release approximately one-half the herd to permit dispersal in the adjacent range and in this way gradually repopulate the badlands area.

PROCEDURE:

The antelope trap was used and was set up on the northwest boundary of the fence, using the southwest boundary as a drift fence. Along a ridge running east and west from the main trap a wing was constructed for about 80 rods.

Twelve men afoot started the drive from the northwest corner following along the east boundary down to the southeast corner, thence along the south-east boundary to the southwest corner, thence along the southwest boundary which was used as the drift fence in hazing the sheep toward the trap.

The first drive was a dry-run. The second drive netted one ram in the trap and four sheep near the main gate. Before the crew could reach the gate

the sheep "spooked" and ran out of the wings. The third attempt in driving the sheep proved unsuccessful.

The trap was taken down and it was decided that on the east boundary 40 yards of wire be removed and strung west forming an angle. This fence running east and west was used as a wing into which it was hoped the sheep could be hazed and released.

Two attempts were made and this also was unsuccessful.

The fence was repaired and the project was discontinued for the present.

RECOMMENDATIONS:

It is recommended that part of the wire be removed and strung at an angle forming a wing, as was tried before, only using a different location where the terrain is not so rugged, and that more men be employed, as it was proven that bighorn sheep are faster than man.

Submitted by:
William Koch, Junior Foreman
Wildlife Restoration Division

STATE Montana
PROJECT 39-R
DATE January 15, 1950

QUARTERLY PROGRESS REPORT
FOR
SURVEYS AND INVESTIGATIONS
As Required By
FEDERAL AID TO WILDLIFE RESTORATION ACT

Personnel: Wynn G. Freeman, Waterfowl Biologist, Wildlife Restoration
Division

Gerald Salinas, Assistant Waterfowl Biologist, Wildlife
Restoration Division

Harvest:

A split season totaling 36 days was chosen by the State of Montana for their waterfowl hunting in 1949. The first hunting period began on October 7 and extended through October 21. The second period comprised the interval of November 18 through December 5, 1949. This season gave an extension of eight days over the 1948 hunting season. The bag limit remained the same.

In an effort to obtain information on the waterfowl kill, voluntary checking stations were again run in areas of hunter concentration (figure 1*). These areas have been described previously, but for the sake of clarity the descriptions will be reiterated. One station was located on Highway 93 about three miles south of Missoula. Checking at this point sampled the waterfowl kill made in the Bitterroot Valley. The second checking station was established near Ravalli at the junction of U. S. Highway 10 and Highway 93. This station sampled the kill made by hunters in the lower Flathead Valley. The third checking station was located east of the Continental Divide about four miles west of Great Falls on the combined Highway 89 and 91. The area sampled by this station included Freeze-Out Lake, the Fairfield Bench and the regions near Choteau, Augusta and Agawam. In addition to these areas which were sampled during 1948, the population trend area located in the Blackfoot Valley was sampled during the ice free portion of the first hunting period, and the Gallatin Valley around Bozeman was checked sporatically during the entire season.

The number of hunters checked through our voluntary checking stations during the 1949 hunting season was 2,959. (table 1.) The number of hunters per party varied directly with the distance traveled for hunting. Only slight variations in the numbers of hunters per party were apparent during the two

* Figures and tables shown in Appendix A.

hunting periods for each area sampled. The over-all average for hunters per party was 2.2. This average varied only one tenth of a hunter from the state average of pheasant hunter parties during the past two years. The average number of hunters per party for pheasant hunting has been 2.3.

The average number of birds per hunter per trip for the entire season was 1.4. (See table I.) With the exception of Great Falls, the average number of birds per hunter varied only slightly between the early and the late hunting periods in all areas. In the Great Falls area, the number of birds per hunter dropped from 1.8 during the first period to 1 bird per hunter per trip during the second period.

The pheasant season for the state opened on October 30, five days after the first waterfowl hunting period closed. This provided an excellent opportunity to obtain personal interview information concerning hunter activity during the first half of the waterfowl hunting season. Hunters, passing through pheasant checking stations, were asked if they had hunted ducks during the first period, the number of hunting trips made, and the number of ducks killed per hunter. (See table II.)

Information on which hunters from all areas were consistent was the number of times they went hunting during the first period. They averaged 2.5 trips to the field. The number of birds per trip showed some variation from the results obtained by our waterfowl checking stations. The average number of birds per trip calculated from waterfowl bag checks was 1.5 while the average number of birds calculated from the pheasant hunter interviews was 1.8.

As in 1948, the mallard was again the most numerous bird in the bag for all areas checked. (See tables III and IV.) The percentage of mallards in the

bag increased considerably for each area between the first period and the second hunting period. Fifty-eight per cent of the total bag during the first period was mallards, compared to 77 per cent during the second period. The kill of other species was relatively equally divided. The following waterfowl showed a slight variation in per cent of total bag between the early and late hunting periods. The golden-eye, like the mallard, made up a slightly larger per cent of the bag during the second hunting period. Several species including pintails, green-winged teal, blue-winged teal, wood ducks, canvasbacks, redheads, ringnecks, ruddy ducks, greater scaups, and white-winged scoters were slightly more evident in the bag during the early period than during the later period. The remaining species showed neither tendency clearly. (See table V.) A few wood ducks were again killed in the Bitterroot area. The redheads, that made up a large portion of the nesting waterfowl in lower Flathead Valley, provided only a small per cent of the kill in this area as compared to 1948.

The numerical order of the various species and their respective percentages of the bag did not seem to vary excessively between 1948 and 1949 (table V.) During both years, mallard provided a greater per cent of the bag the second period than it did the first. The baldpate migration was seemingly later in 1948 than it was in 1949 and provided a fair portion of the bag both years, especially in the Flathead Valley. (See tables III and IV.) The one surf scoter reported was killed following a severe storm and is thought to have been blown off its intended course.

In addition to the previously mentioned checking station information, warden checks of hunters in the field and checks by students at Montana State College provided the additional information listed in table VI. The number of birds per trip calculated from these data (1.5) compares favorably with

the 1.4 birds per trip derived from checking station data. Species composition remains practically the same with mallard providing the great bulk of the kill. By combining all the information on the kill, the five most important species constituting the bag of waterfowl in 1949 were as follows: Mallard, pintail, baldpate, green-winged teal, and shoveller. These above mentioned species contributed 85 per cent of the total bag during 1949 (table VI). For comparison, the five principal breeding ducks in Montana during 1949 were as follows: Mallard, pintail, blue-winged teal, shoveller and baldpate.

A large per cent of the total birds examined during the first hunting period were checked during the first three days of that period. (See table VII.) The inference is not that the same high percentage of the total birds bagged in these areas was shot during the first three days of the season, but rather that some other more effective method of bag appraisal should be worked out for the period after the opening weekend of each hunting period.

Over 63 per cent of the total bag was checked during the first periods' activity at all checking stations (table VII). This may bear out a theoretical conclusion that whenever a checking station is purely voluntary, the effectiveness decreases at an ever increasing rate after the initial effort.

Sex and age data on Mallards were gathered whenever time permitted. Mallard was the only species examined in quantity sufficient for analysis. There was no significant correlation between the total ratios of the various areas at any time during the season (table VIII). Generally speaking, the number of adult per juvenile increased in the second period indicating a probable early migration of juveniles; the number of males per 100 females increased considerably during the second period and the number of adult males for each 100 adult females increased by 80 per cent, indicating an exodus of

females between seasons, particularly adult females. This was also indicated in the increased ratio of juvenile females and adult females. Conversely, the foregoing data may indicate a later influx of adults and the later arrival of males. The sex ratio for juveniles tended toward equalization in the second period.

Mallard weights were taken at four checking stations whenever time permitted. A breakdown of these weights is presented in table IX. It is of interest that the average weights of the males and the average weights of the females corresponds exactly to the averages listed by Kortright (The Ducks, Geese and Swans of North America). The largest mallard weighed was an adult male weighing 3 pounds 10 ounces, while the smallest was a juvenile female weighing 1 pound 10 ounces.

The duck stamp sales for the State of Montana as of January 29, 1950, was tabulated at 30,966. The average number of trips per hunter for the first period was figured at 2.5.(See table II.) The average number of trips per hunter for the second period was 2.8 which was determined from personal interviews of 119 hunters. The average number of birds bagged for each trip to the field was 1.4. (See table VI.) The resulting estimate of the total birds bagged in the State of Montana during the 1949 hunting season is 229,148.

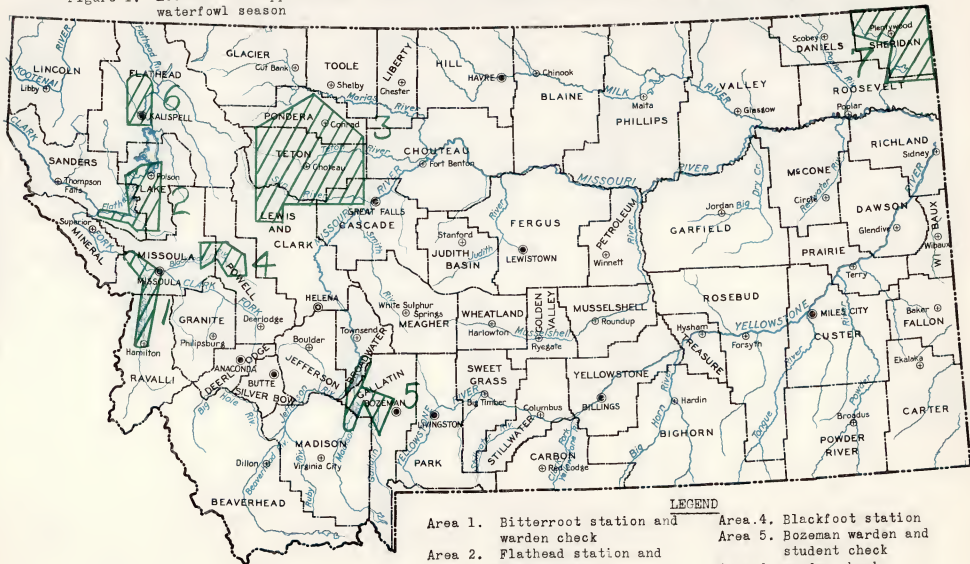
A more accurate estimate of hunter success will be possible when the hunter questionnaire now being assembled is tabulated.

Weekly Census:

Yearly summaries of the weekly census data are plotted as to species by areas following the appendicised tables.

MONTANA.

Figure I. Location and approximate extent of areas from which bag checks were made during the 1949 waterfowl season



LEGEND

- | | |
|---|--|
| Area 1. Bitterroot station and warden check | Area 4. Blackfoot station |
| Area 2. Flathead station and warden check | Area 5. Bozeman warden and student check |
| Area 3. Great Falls station | Area 6. warden check |
| | Area 7. Warden check |



Table I. Hunter information obtained from voluntary checking stations in Montana during the 1949 waterfowl hunting season

Area	Number of Parties			Number of Hunters			Birds Bagged			Hunters/ Party			Birds/ Hunter		
	1st	2nd	Season	1st	2nd	Season	1st	2nd	Season	1st	2nd	Season	1st	2nd	Season
	Half	Half	Total	Half	Half	Total	Half	Half	Total	Half	Half	Total	Half	Half	Total
Great Falls	279	69	348	647	163	810	851	214	1065	2.3	2.4	2.3	1.3	1.3	1.3
Flathead	167	144	311	387	328	715	681	326	1007	2.3	2.3	2.3	1.8	1.0	1.4
Bitterroot	173	106	279	346	203	549	443	255	698	2.0	1.9	2.0	1.3	1.3	1.3
Blackfoot	40		40	99		99	189		189	2.5		2.5	1.9		1.9
Totals	659	319	978	1479	694	2173	2164	795	2959	2.2	2.2	2.2	1.5	1.2	1.4

Table II. Data on waterfowl hunting activities during the first half of the 1949 season obtained from interviewing pheasant hunters

Area	Number Hunters	Days Hunted	Birds Bagged	Days Hunted 1st Period	Birds/ Hunter	Birds/ Day
Great Falls	152	387	769	2.5	5.1	2.0
Flathead	177	447	784	2.5	4.4	1.8
Flathead	367		1894		5.2	
Flathead	68		239		3.5	
Bitterroot	88	211	351	2.4	4.0	1.7
Bitterroot	70		300		4.3	
Totals	417	1,045	1,904	2.5	4.6	1.8
Grand Total	922		4,337		4.7	

Table III. Composition of the hunters' bag of waterfowl during the first half of the 1949 season
as obtained from voluntary checking stations

Species	Great Falls		First Half of the Hunting Season				Blackfoot		Total	
	No.	%	Flathead No.	%	Bitterroot No.	%	No.	%	No.	%
Mallard	510	59.1	360	52.7	290	65.5	108	57.1	1268	58.3
Pintail	96	11.3	29	4.2	13	2.9	8	4.2	146	6.7
Baldpate	41	4.8	124	18.2	26	5.9	17	9.0	208	9.6
Gadwall	32	3.8	13	1.9	3	0.7	3	1.6	51	2.3
Shoveller	33	3.9	25	3.7	4	0.9	4	2.1	66	3.0
G. W. Teal	58	6.9	54	7.9	69	15.5	19	10.1	200	9.2
B. W. Teal	21	2.5	19	2.8	3	0.7	8	4.2	51	2.3
Wood Duck					6	1.4			6	0.3
Canvasback	7	0.8			2	0.5			9	0.4
Redhead	18	2.1	19	2.8	3	0.7	3	1.6	43	2.0
Ringneck			1	0.1	4	0.9	6	3.2	11	0.5
L. Scaup	23	2.7	10	1.5	2	0.5	8	4.2	43	2.0
Ruddy	1	0.1	4	0.6	9	2.0			14	0.6
Bufflehead	4	0.5	6	0.9	3	0.7	2	1.1	15	0.7
G. Scaup			3	0.4	1	0.2	1	0.5	5	0.2
Golden-eye	1	0.1	5	0.7			2	1.1	8	0.4
W. W. Scoter	1	0.1							1	Tr
Surf Scoter	1	0.1							1	Tr
Misc. Unid.					5	1.1			5	0.2
Canada Geese			9	1.3					9	0.4
Snow Geese	16	2.0							16	0.7
Totals	863		681		443		189		2,176	

Table IV. Composition of the hunters' bag of waterfowl during the second half of the 1949 season
as obtained from voluntary checking stations

Species	Second Half of Hunting Season						Total	
	Great Falls		Flathead		Bitterroot		No.	%
	No.	%	No.	%	No.	%		
Mallard	139	77.2	216	66.3	235	92.1	590	77.5
Pintail	4	2.2	15	4.6	7	2.7	26	3.4
Baldpate	6	3.3	39	12.0	2	0.8	47	6.2
Gadwall	3	1.7	2	0.6			5	0.7
Shoveller	9	5.0	5	1.5			14	1.8
G. W. Teal	1	0.6	2	0.6	6	2.3	9	1.2
B. W. Teal			1	0.3	1	0.4	2	0.3
Wood Duck								
Canvasback	2	1.1					2	0.3
Redhead	1	0.6	2	0.6			3	0.4
Ringneck			2	0.6			2	0.3
L. Scaup	9	5.0	9	2.8			18	2.4
Ruddy								
Bufflehead	1	0.6	1	0.3			2	0.3
G. Scaup								
Golden-eye	2	1.1	12	3.7			14	1.8
W. W. Scoter								
Surf Scoter								
Misc. Unid.					2	0.8	2	0.3
Canada Geese	3	1.7	20	6.1	2	0.8	25	3.3
Snow Geese								
Totals	180		326		255		761	

Table V. Yearly comparisons of waterfowl kill in Montana as determined from voluntary checking stations

Species	1st Half of Season				2nd Half of Season				Grand Total			
	1948		1949		1948		1949		1948		1949	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mallard	907	67.9	1268	58.3	580	72.3	590	77.5	1487	69.6	1838	63.3
Pintail	71	5.3	146	6.7	20	2.5	26	3.4	91	4.3	172	5.9
Baldpate	82	6.1	208	9.6	96	12.0	47	6.2	178	8.3	255	8.7
Gadwall	20	1.5	51	2.3	13	1.6	5	0.7	33	1.5	56	1.9
Shoveller	36	2.7	66	3.0	7	0.9	14	1.8	43	2.0	80	2.7
G. W. Teal	67	5.0	200	9.2	19	2.4	9	1.2	86	4.0	209	7.1
B. W. Teal	28	2.1	51	2.3	2	0.3	2	0.3	30	1.4	53	1.8
Wood Duck	17	1.3	6	0.3	2	0.3	-	-	19	0.9	6	0.2
Canvasback	11	0.8	9	0.4	5	0.6	2	0.3	16	0.7	11	0.4
Redhead	37	2.8	43	2.0	15	1.9	3	0.4	52	2.4	46	1.6
Ringneck	4	0.3	11	0.5	1	0.1	2	0.3	5	0.2	13	0.4
L. Scaup	36	2.7	43	2.0	13	1.6	18	2.4	49	2.3	61	2.1
Ruddy	6	0.5	14	0.6	-	-	-	-	6	0.3	14	0.5
Bufflehead	9	0.7	15	0.7	10	1.2	2	0.3	19	0.9	17	0.6
G. Scaup	2	0.2	5	0.2	-	-	-	-	2	0.1	5	0.2
Golden-eye	3	0.2	8	0.4	17	2.1	14	1.8	20	0.9	22	0.7
W. W. Scoter	2	0.2	1	Tr	-	-	-	-	2	0.1	1	Tr
Surf Scoter	-	-	1	Tr	-	-	-	-	-	-	1	Tr
Unid.	-	-	5	0.2	-	-	2	0.3	-	-	7	0.2
Canada Geese	-	-	9	0.4	-	-	25	3.3	-	-	34	1.2
Snow Geese	-	-	16	0.7	-	-	-	-	-	-	16	0.5
Totals	1,336		2,176		802		761		2,138		2,937	

Table VI. Species composition of the hunters' bag of waterfowl as determined from warden and student checks

	Bozeman*		Missoula**		Westby***		Total		Total Plus		
	Area		Kalispell		Area		Total		Checking Station		
			Area						Total		
Hunters	379		222		518		1,119		3,292		
Birds/ Hunter	1.1		1.6		1.9		1.5		1.4		
1949 Bag Check											
Species	No.	%	No.	%	No.	%	No.	%	No.	%	
Mallard	259	71.2	222	61.0	708	73.6	1189	70.5	3027	65.8	
Gadwall	25	6.9	1	0.3	15	1.6	41	2.4	97	2.1	
Baldpate	6	1.6	21	5.8			27	1.6	282	6.1	
Pintail	17	4.7	60	16.5	36	3.7	113	6.7	285	6.2	
G. W. Teal	16	4.4	4	1.1			20	1.2	229	5.0	
B. W. Teal	18	4.9	2	0.5			20	1.2	73	1.6	
Shoveller	3	0.8	3	0.8	51	5.3	57	3.4	137	3.0	
Redhead	1	0.3			50	5.2	51	3.0	97	2.1	
Canvasback	1	0.3	2	0.5	73	7.6	76	4.5	87	1.9	
Scaup	11	3.0	2	0.5			13	0.8	74	1.6	
Others									86	1.9	
Canada Geese	7	1.9	39	10.7	29	3.0	75	4.4	109	2.4	
Snow Geese			4	1.1			4	0.2	20	0.4	
Totals	364		360		962		1,686		4,603		

- * District Warden Supervisor Gene Sherman and college students
 ** Deputy Wardens Clyde Howard, Oz Nollar, William Maloit
 *** Deputy Warden Harold Gartside

Table VII. Per cent of total bag examined during each checking period

Periods	Number Birds Checked			Per Cent of Total Each Half			Per Cent of Grand Total			Per Cent of Grand Total		
	GF*	Fh**	Br***	GF	Fh	Br	GF	Fh	Br	GF	Fh	Br
October 7, 8, 9	642	453	403	74.5	66.3	90.8	61.6	44.9	57.6			
October 15, 16	59	98	41	6.9	14.4	9.2	5.7	9.7	5.9			
October 22, 23	161	132		18.7	19.3		15.4	13.1				
1st Half Total	862	681	444							82.6	67.7	63.4
12-M November 18,19,20	83	194	209	45.9	59.5	81.7	8.0	19.2	30.0			
November 26, 27	56	23	15	30.9	7.1	5.8	5.4	2.3	2.1			
December 3, 4, 5	42	109	32	23.2	33.4	12.5	4.0	10.8	4.6			
2nd Half Total	180	326	255							17.4	32.3	36.6
Grand Total	1,043	1,007	699									

* Great Falls
 ** Flathead
 *** Bitterroot

Table VIII. Sex and age ratios of mallards bagged during the 1949 waterfowl season

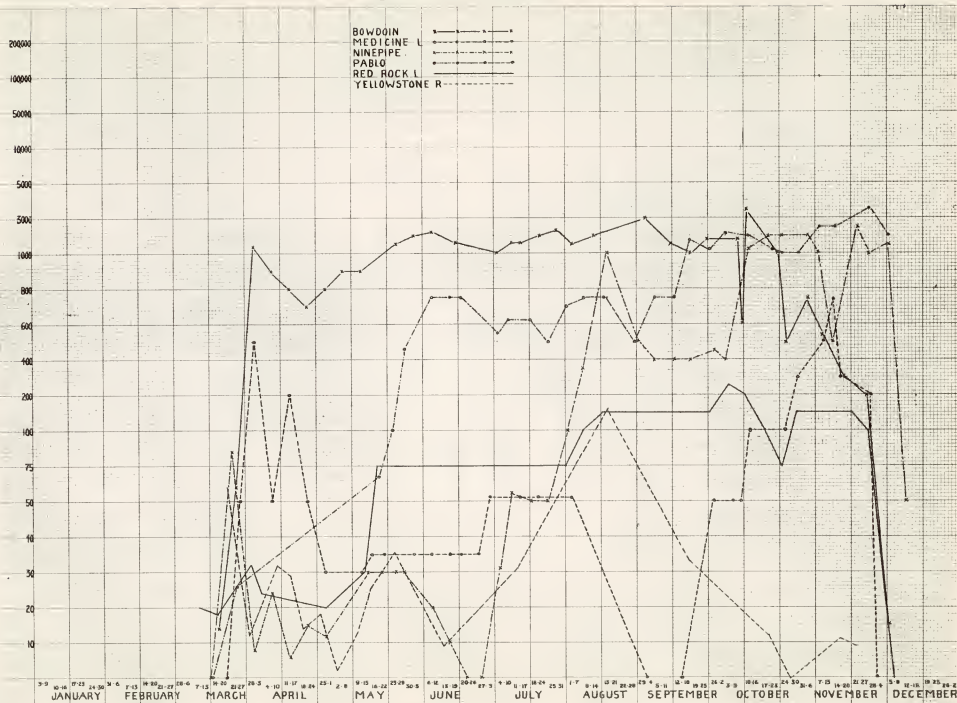
AREA	NUMBERS				RATIOS				
	Male		Female		Juveniles	Juv. Females	Males Per	Adult Males:	Juv. Males:
1st Half of Season	A	J	A	J	Per 100 Adults	Per 100 A. Females	100 Females	100 Adult F.	100 Juv. F
Great Falls	133	111	97	85	85.2	88	134	137	131
Flathead	70	79	62	54	100.8	87	128	113	146
Bitterroot	74	75	70	71	101.4	101	106	106	106
Blackfoot	35	20	24	23	72.9	96	117	146	87
Total	312	285	253	233	91.7	92	123	123	122
<u>2nd Half of Season</u>									
Flathead	62	25	33	25	52.6	76	150	188	100
Bitterroot	70	61	29	57	119.2	197	152	241	107
Total	132	86	62	82	86.6	132	151	213	105
Grand Total	444	371	315	315	90.4	100	129	141	118

Table IX. Weight samples of mallards in Montana taken during the 1949 hunting season

Area	Birds Examined	Ave. Wt. Males	Ave. Wt. Females	Average Weight of Sex & Age Classes			
				Males		Females	
				A	J	A	J
Blackfoot	81	2# 10.7 oz.	2# 5.3 oz.	2# 12.3 oz.	2# 8.5 oz.	2# 6.3 oz.	2# 5 oz.
Bitterroot	180	2# 10 oz.	2# 5 oz.	2# 12.5 oz.	2# 7.7 oz.	2# 6.8 oz.	2# 4.2 oz.
Flathead	110	2# 10.3 oz.	2# 5.3 oz.	2# 13.7 oz.	2# 8 oz.	2# 6.3 oz.	2# 4.3 oz.
Bozeman	208	2# 12.3 oz.	2# 7.3 oz.				
Total	579	2# 11 oz.	2# 6 oz.	2# 12.8 oz.	2# 7.8 oz.	2# 6.7 oz.	2# 4.3 oz.

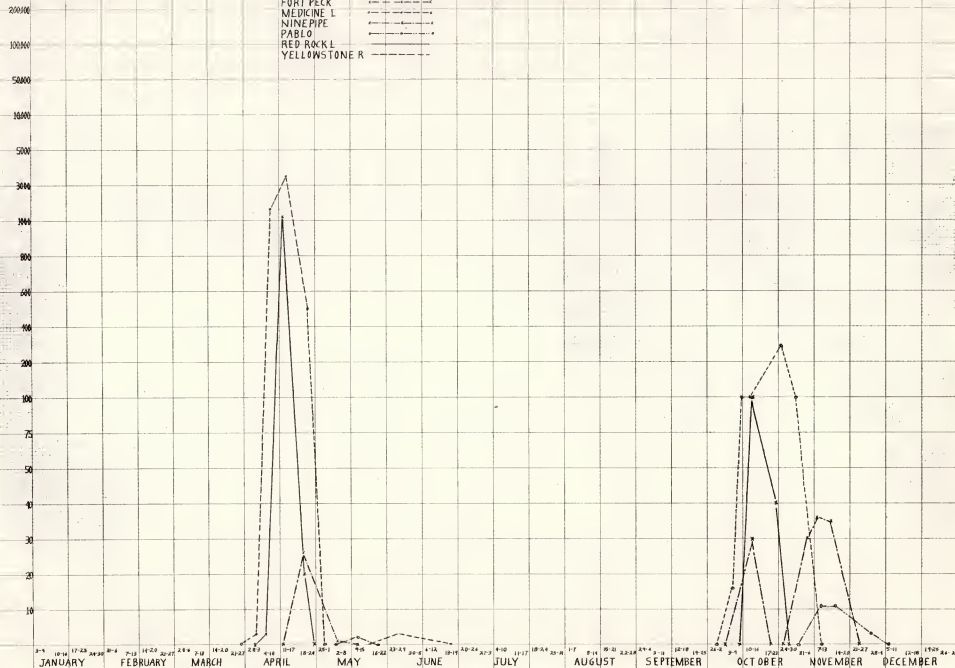


CANADA GOOSE



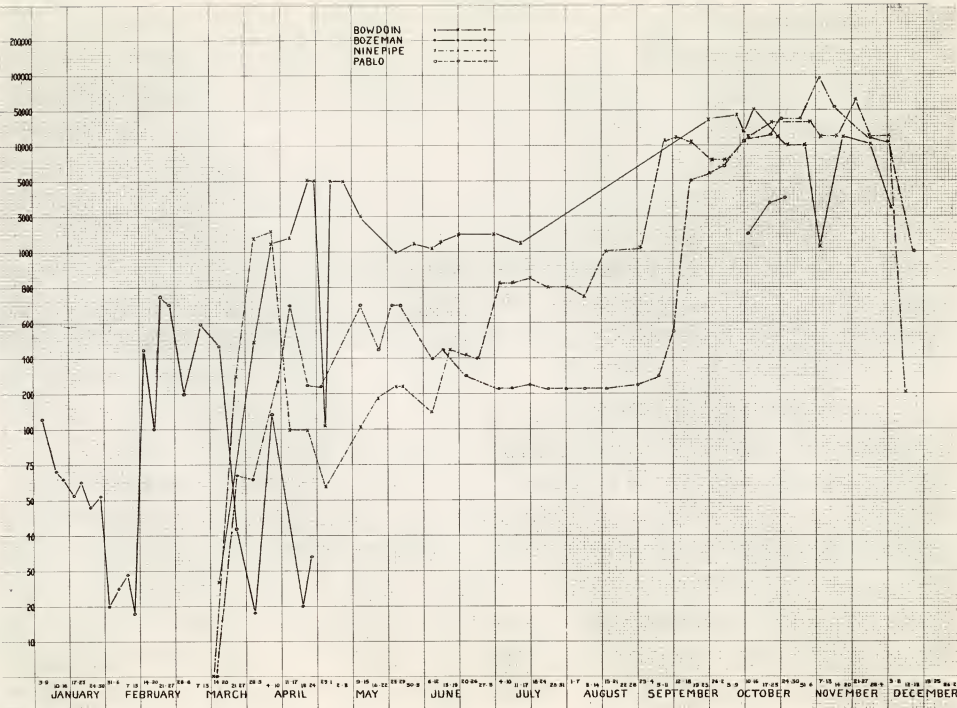
LESSER SNOW GOOSE

BOWDOIN
BOZEMAN
FORT PECK
MEDICINE L
NINEPIPE
PABLO
RED ROCK L
YELLOWSTONE R



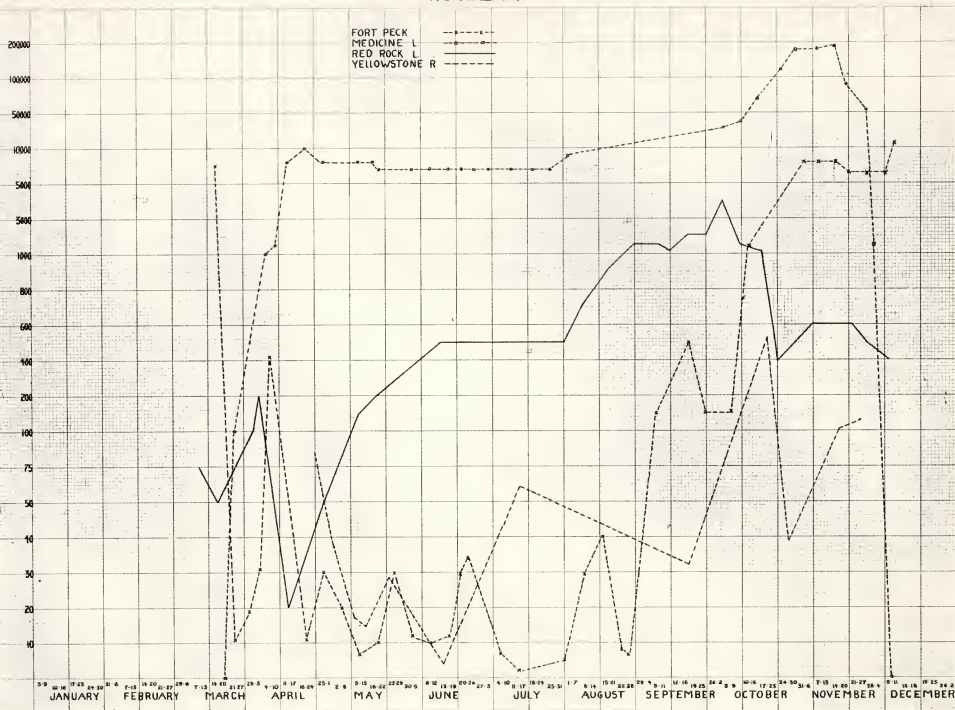


MALLARD



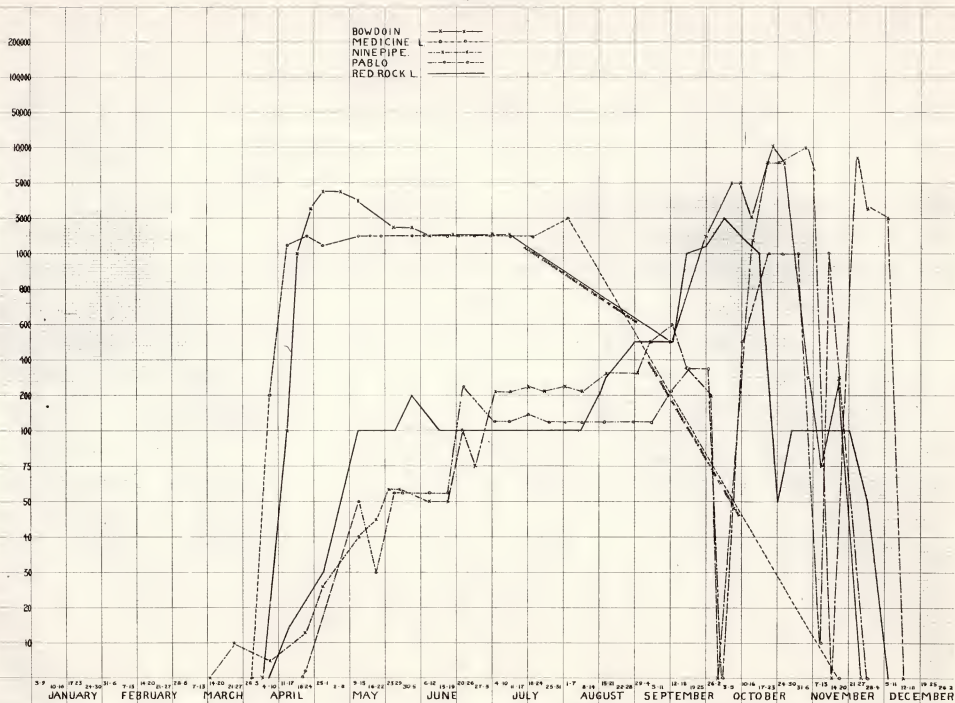


MALLARD



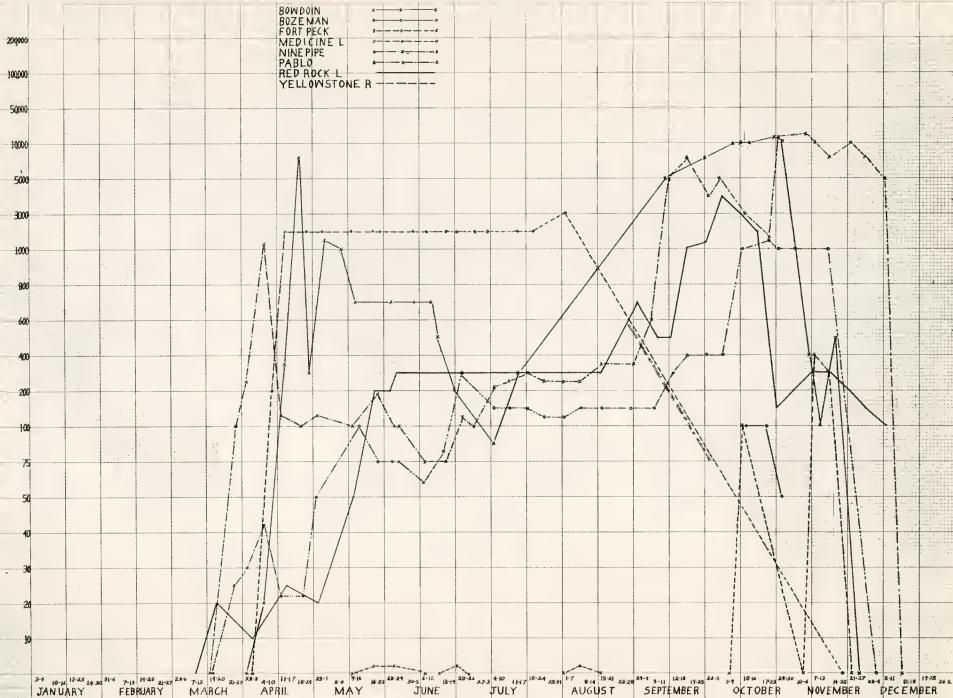


GADWALL



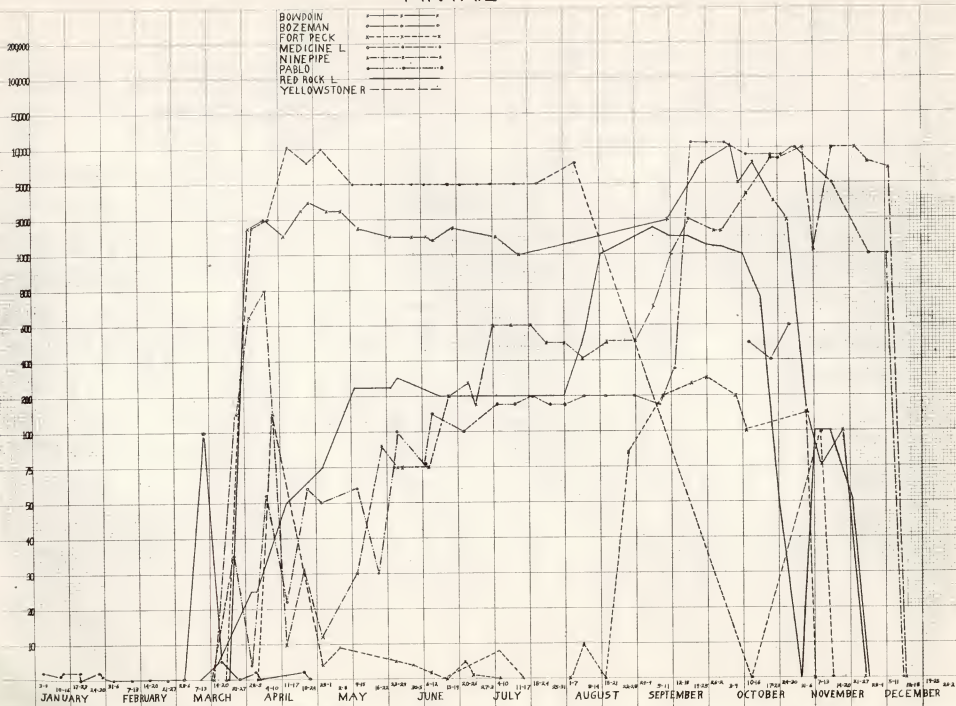


BALDPATE

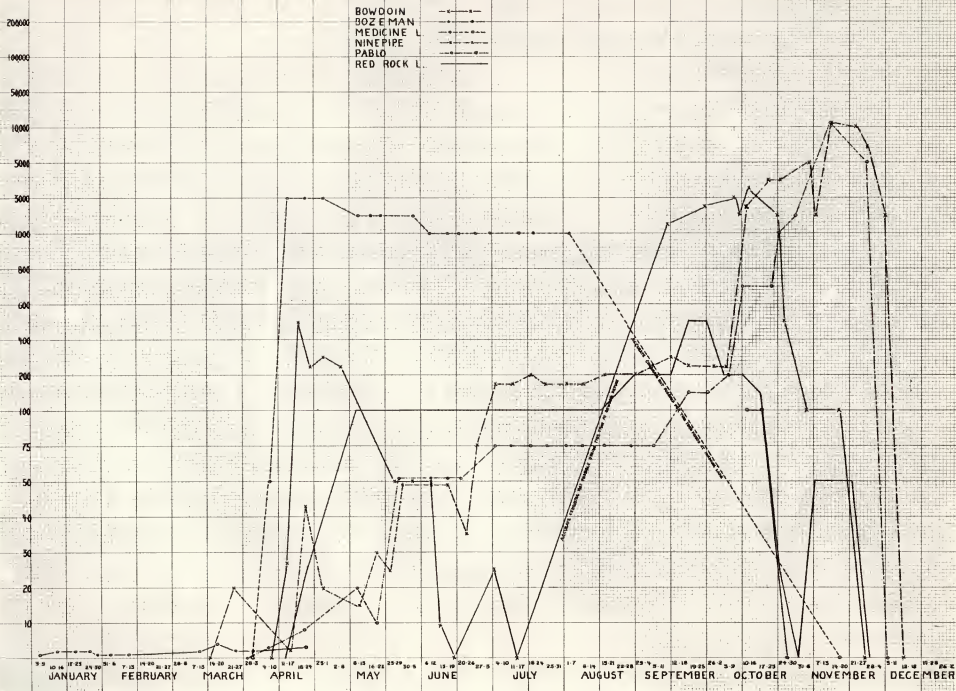




PINTAIL



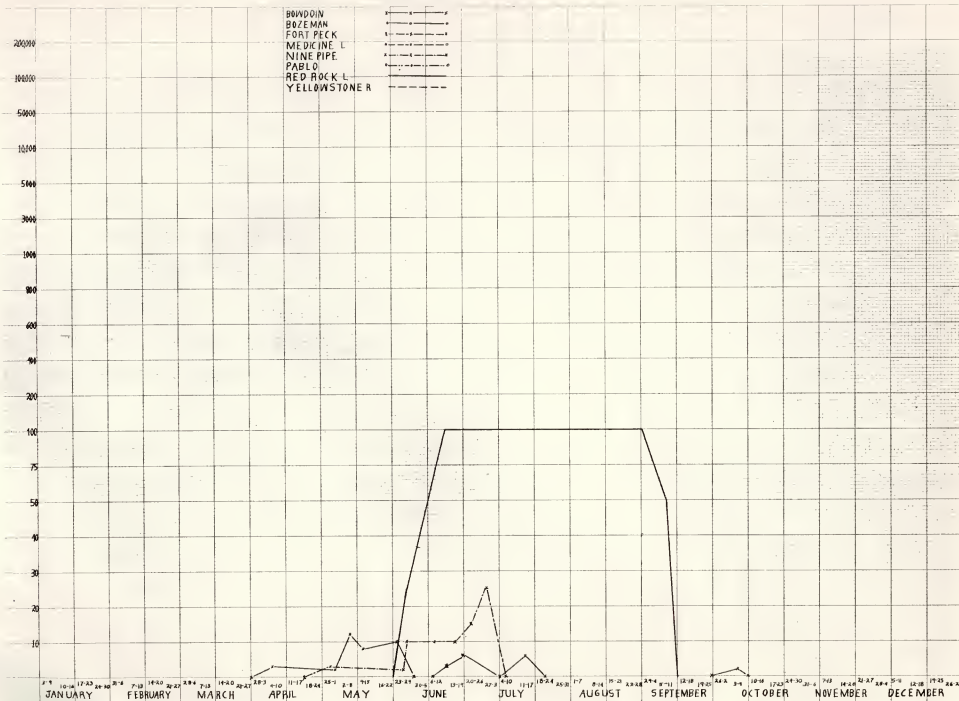
GREEN-WINGED TEAL





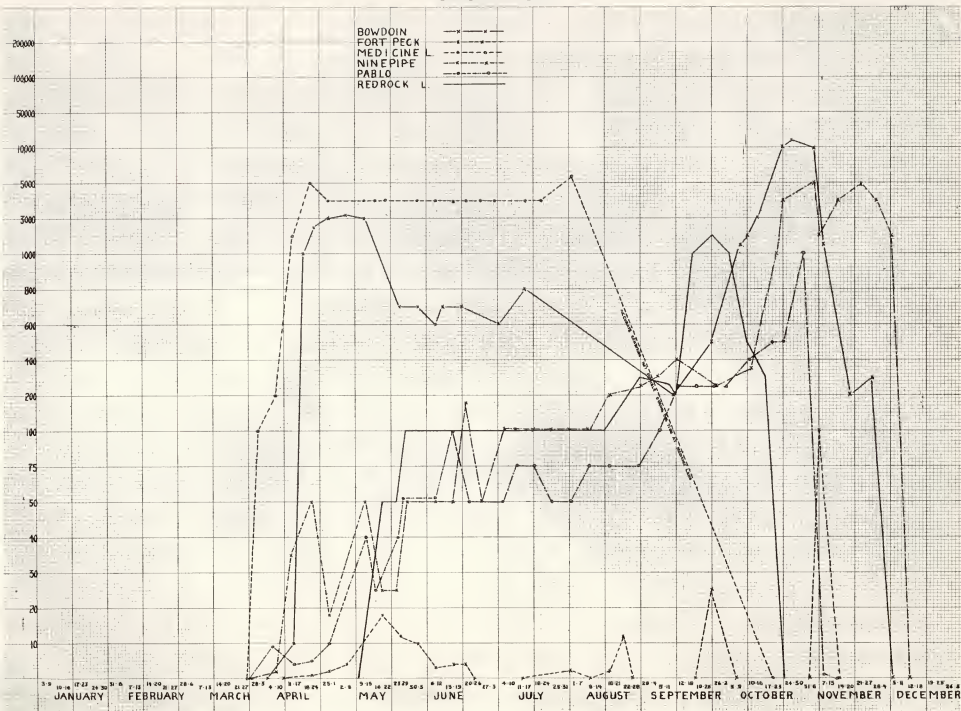


CINNAMON TEAL





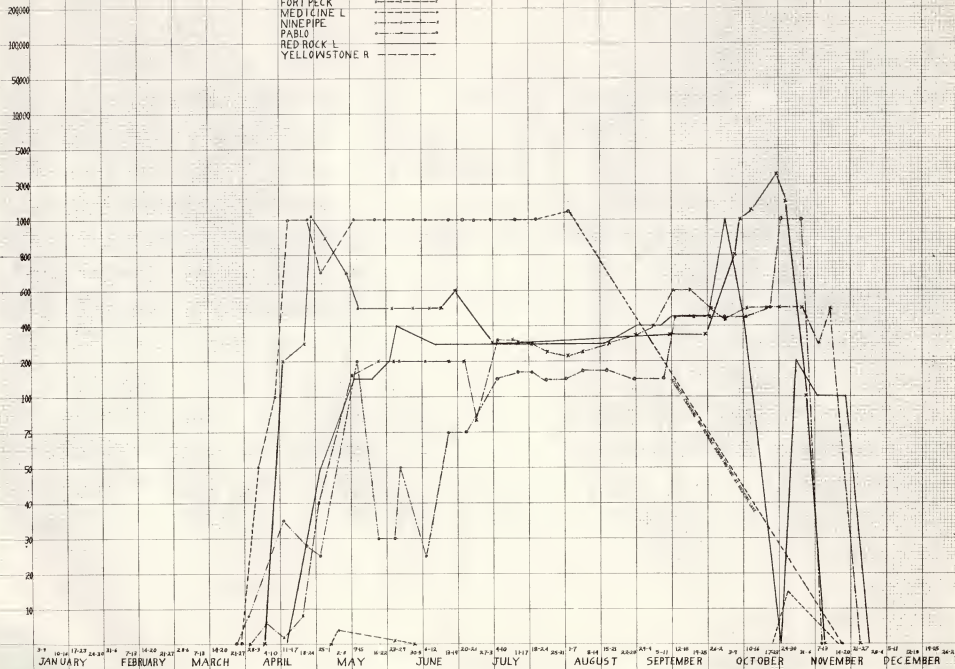
SHOVELLER





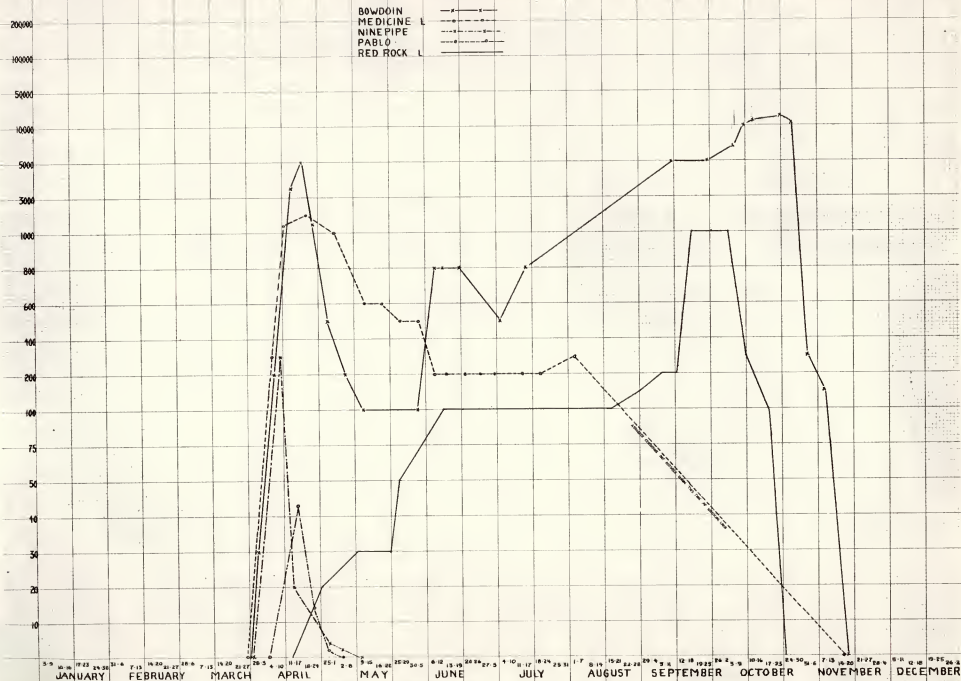
REDHEAD

BOWDOIN
BOZEMAN
FORT PECK
MEDICINE L
NINEPIPE
PABLO
RED ROCK L
YELLOWSTONE R



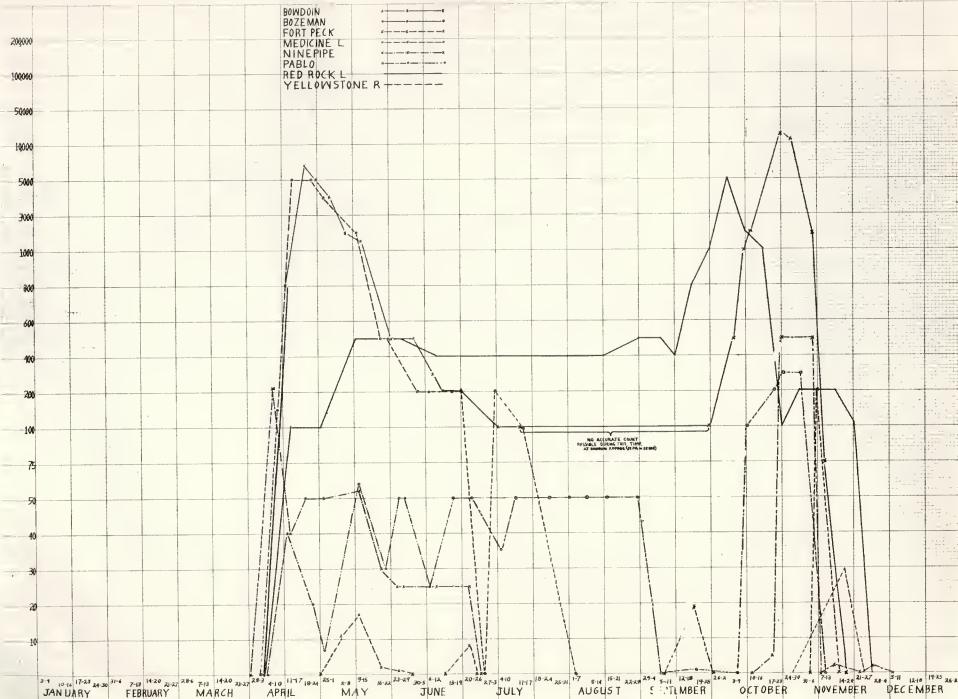


CANVASBACK





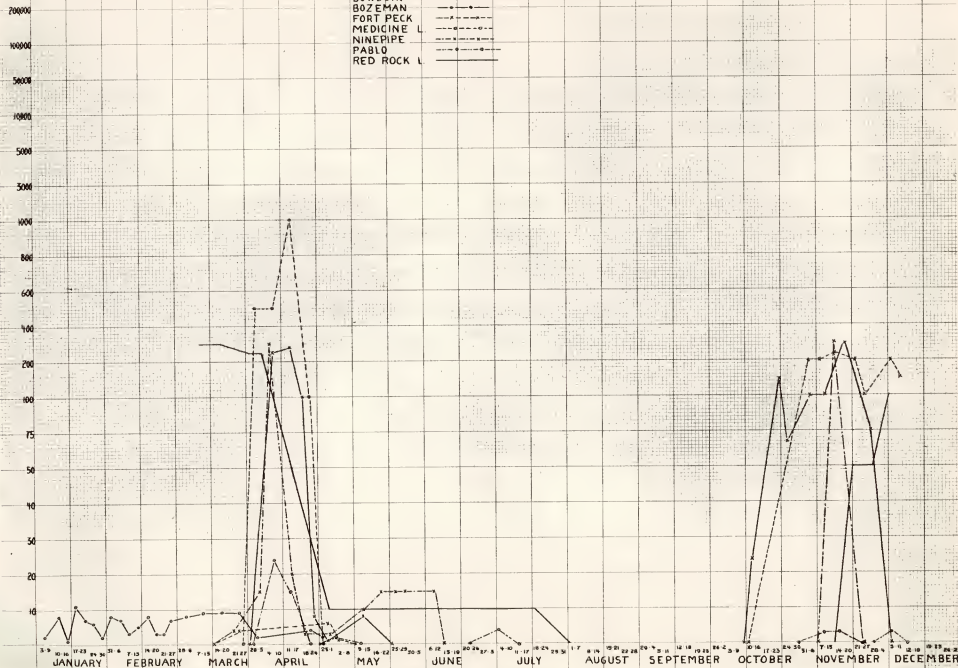
SCAUP





GOLDEN-EYE

BOWDOIN
BOZEMAN
FORT PECK
MEDICINE L
NINEPIPE
PABLO
RED ROCK L







RUDDY

BOWDOIN
BOZEMAN
FORT PECK
MEDICINE L
NINEPIPE
PABLO
RED ROCK L
YELLOWSTONE R

20000
10000
5000
1000
500
200
100
75
50
40
30
20
10

10000

5000

5000

1000

500

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100

75

50

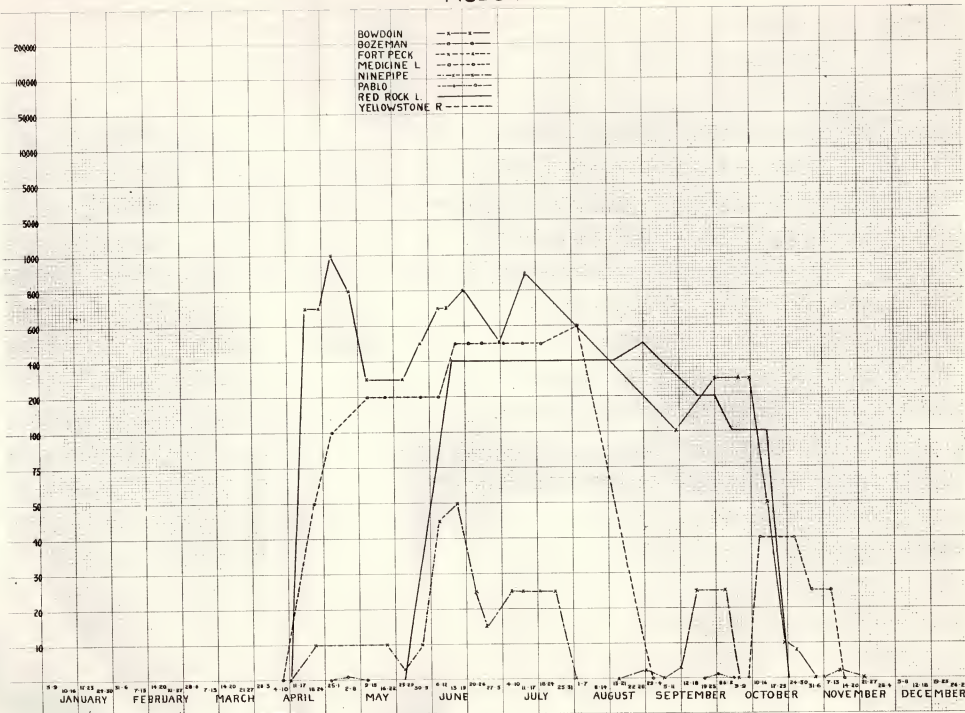
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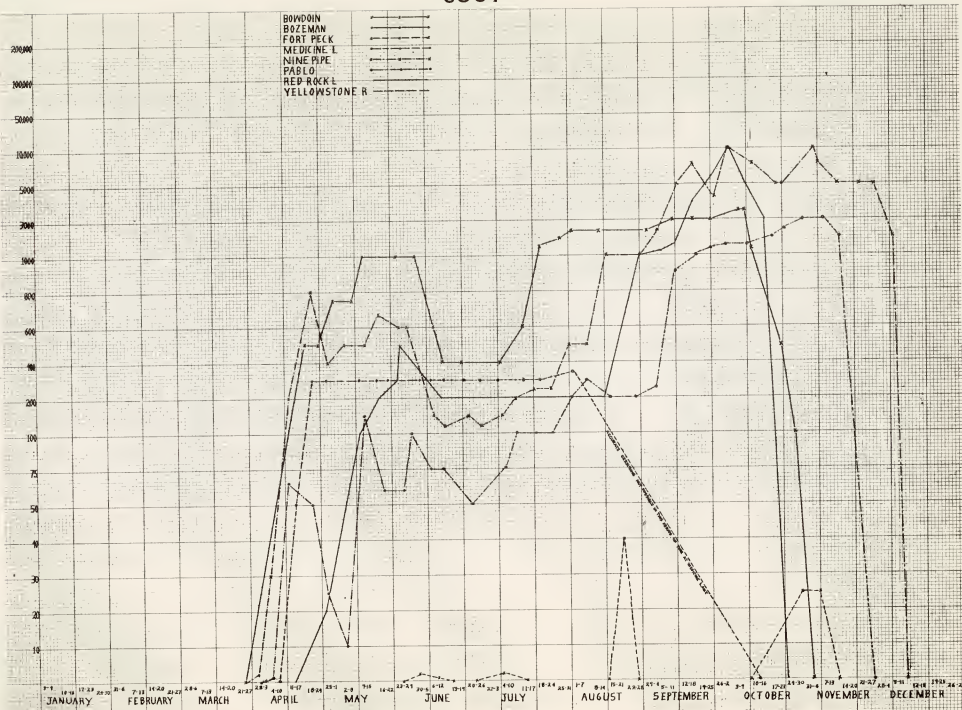
10

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER





COOT





MERGANSERS

